— HOW SUCCESSFUL DEALERS OPERATE —

Two Warren, Ohio, Dealers Find Intensive Training of Salesmen and New Forms of Demonstrations Way to Sales Success

By Ross Potter

Fisher Co. Gives Sales Bonus Instead of Cutting Prices

Following G-E policy, Norman A. Kirchner, store manager of the Fisher Appliance Co., Warren, Ohio, trains his men with records and films. He needs five men through the winter, 10 when the spring thaw begins to crack the market. Mr. Kirchner himself has been in Warren only a year, coming from Youngstown to head Fisher Appliances when the utility here, Ohio Peoples Service Electric Shops, Inc., surrendered the G-E franchise a year ago.

No beginning salesman is given a chance on the floor until he has put in two months on cold canvassing. A closely checked file is kept of all prospects. Customers are checked back on every two months, the dealership using good service to keep goodwill. The sales idea of "using the user" comes into the picture indirectly but very effectively in this way:

NEW SALESMEN SEE USERS

"When a salesman is just beginning we fill his first day's schedule with call-backs to G-E users," the manager outlined. "We did that just recently to a young fellow who's on our regular sales force now. He came in all smiles at the end of his first day. 'Say!' he came up to me; 'you know, I didn't sell a thing all day long. But I must have called on 25 people, and every one of them sure thought a lot of their G-E units!'

"Every one of those users had the same effect as a sale as far as he was concerned," the sales head emphasized. "When a salesman honestly believes his product is the best people can buy, he is a salesman. And it's good support when he can quote satisfied users nearby. That youngster sold 5 washers, 2 refrigerators, 2 cleaners and 2 radios in his first two weeks."

NEW 'HEAD SALESMAN' DAILY

Salesmen rotate as head man in control of the floor. On his day each man arranges all the appliances just as he wants to. Every sale on the floor that day goes to his credit, and Mr. Kirchner reasons that each one should work out his own ideas. The open floor plan makes it that much easier.

The idea of keeping enthusiasm fresh in mind is a constant factor in the dealership's sales policy, the manager stated. The feature appliance is changed every two weeks, and special films and records are put on just before the new fortnight breaks.

"Instead of knocking the price tag on a $40 washer down to $36, we offer the $4 as a bonus to the salesman for every washer he sells during the push. And how they sell! We've never had to cut a list price.

"If any of our men likes one appliance particularly, he can feature it on his floor day as often as he wants to. It's up to him. And in the end it works out the same proportion—but the volume goes up. It keeps the whole staff on the alert. Each man is playing his own game.

"Of course," he mused, "sometimes it works out in a funny way—this was some time ago. One of the young fellows was running his first floor day. A couple came in to look at a refrigerator. He started in talking up a deluxe model he had on the floor, and he talked it up away over any refrigerator I'd ever seen. Well, he sold it.

"After they'd gone he came over to me with the order, all enthusiasm. I advised him then to take it a little easy. If everything he'd said were true then those people had gotten a tremendous bargain. But what if something went wrong in the near future? His whole story would fall through.

SELLING THEM '200%'

"'Well,' he explained to me, half-seriously, 'I've heard that people believe only half of what a salesman tells them, and I was trying to hit 200%.' He had me there for a minute, because nine times out of 10, it's true.

"As it happens, the couple are two of our most satisfied customers; they've come back here for other appliances. And we've had good luck, because we've never had to make a service call. And our man has cooled down. He's one of our best salesmen. But you can see what I mean when I said enthusiasm can be carried too far."

People coming in, wanting to buy but still in the shopping frame of mind, are most impressed with size and appearance in a refrigerator, the manager thought. As far as economy of operation is concerned, he shrugged, every manufacturer claims that.

"I can show them an all-steel cabinet and a hermetically sealed unit that are second to none; but you can't prove that on a sales floor. Gadgets haven't got the pull. The biggest market has descended into the $1,000-$2,000 income families, and they need their money's worth.

"They'd rather be able to work out a few more recipes than have the trick conveniences," he nodded emphatically. "We're planning to put on more home economics demonstrations this year. They're a much better sales argument, because the housewife who's seen one isn't happy until she's had a chance to try it herself.

WANTED TALKING KITCHEN

"We found the talking kitchen a particularly effective display for just that reason. You've seen it—each appliance speaks up in turn, telling all things it can do, and then ties in with the next one. It wasn't up for sale, of course. But I had people come up and ask me how much I thought it would take to fit out one complete."

People would much rather be demonstrated to than talked to, he emphasized. They often ask him the difference between a G-E Monitor Top and a G-E Flatop. They're the same machine, he tells them; but it's not half so convincing as when he takes them over to a little wooden takedown model, as he did me, and changes one model into the other for them.

The coils from around the head he took off and clipped to the back, where they hung in a flat shield; he drew out the vegetable cabinette from below, completely lifted off the Monitor Top and slid it into the vacant compartment; a panel fitting over the opening and another smooth across the top completed the operation.

"You see?" he stepped back. "It takes half the time and it's 10 times as convincing. I can show them either model this way, and they can see and understand the difference in a minute. I've tried telling people; it doesn't go across."

40 RANGES AT ONE CRACK

Electric ranges are coming into the picture gradually, the manager revealed. They have been the slowest of his appliances to sell.

"I did sell 40 of them to the Reeves Apartments, in this building, at the beginning of year," he stated. "That's just once in a hundred; but I think it's a good indication of a market that's coming in."

Best advertising approach for electric appliances in this locale, Mr. Kirchner has found, lies in consistent newspaper spreads. G-E periodically sends through mats with space cut out for insertion of the local dealer's name.

"But it's even better to add special inserts of your own," he amended. "Department stores here, for example, don't use any of the regular mats of the lines they handle, even the nationally known brands. They make up their own spreads, figuring the variety setup is more effective. And after trying it for a while, we've found it's true. Last night we ran copy on electric sweepers. We've sold several today, and one woman openly referred to the ad.

"Every once in a while we'll get a chance to get a consignment of radios at a good price. If we take it, we play up the lot with 40-inch daily spreads. When half of the lot is gone we cut it to 20 inches. After that, 10 inches. It would cost plenty to try that with regular merchandise, but with one shipment and a special price, it takes only a few days to clean them.

HANDBILLS NOT EFFECTIVE

Direct mail and handbills seem to get less and less results, the manager acknowledged. Last summer the store floated 5,000 handbills across the city, a newspaper-size four-page issue.

"I know they were thoroughly circulated," he defended, "because I went out myself and checked them. Otherwise there was hardly any evidence at all. Enough business didn't come in to pay us for printing them. Since then—nothing doing; we stick to the newspapers."

Constant Demonstrations Is Power Company Formula

The first thing that catches your eye entering the OPS building in Warren (Ohio Peoples Service Shops, Inc.) is the completeness of its floor display. I asked C. A. Harries, floor supervisor, how many electric appliances his place handled.

"I don't know," he disclaimed; "I've never counted all of them. I guess we've got everything."

Each of the power company's salesmen are taught to sell all appliances.

"There are four salesmen on the floor, including the young lady over yonder," he nodded briefly, "who demonstrates all the cooking. Fourteen men handle outside sales—that includes nine salesmen working protected territories in the city, a rural man, two commercial men, a range man and a field supervisor.

"Each one does his job in his own way; all we ask is the results. They exchange prospect tips in each other's territory. On the average they try to develop 10 new prospects for every sale.

"I remember when I first came, some years ago," he smiled. "My first month was great going—I sold plenty. The second month I nearly starved; I'd been following every prospect hot to the finish and not working up any new ones."

The whole sales group meets every morning for half an hour's conference before starting out, the manager detailed. They check up ideas, listen sometimes to manufacturers' representatives, follow slides or films, exchange prospects in their different territories; some of them take special courses that come every two weeks or so, and when something unusual turns up, pass it along to the rest.

"Often after some new booklet or group of plans has been given us, I make up a questionnaire and have them answer it. Different ones take to different ideas, and if they can go ahead and try them on their own, it usually shows up in bigger returns in their sales records.

"For instance, we handle both Westinghouse and Frigidaire lines. They're both good. But it's only natural that a salesman eventually comes to like one a little better than the other. And that's the one, all other things being equal, that he'll sell. On the other hand, if the customer expresses a preference, that's a much greater advantage, and that's the one he'll go ahead with."

PREMIUMS ARE OUT

It's bad policy for a utility to have premium sales, Mr. Harries thinks.

"If we were to give away a basket of fruit with every refrigerator sold on a certain day, we'd first have to go out and buy the baskets of fruit. Every grocer in town is a customer of ours—I couldn't buy from them all. So we don't run any premium sales.

"Most of the people who come to buy something don't want to be rushed, anyway. They want to shop around the store, take their time. When they indicate that they want something we ask them if they've previously contacted any of the men on the floor. If they have we turn the sale over to him. We can always check up easily enough; there are only four of us.

PAY DAYS ARE DISPLAY DAYS

"We have discount days for different sections of the city, and we fit our displays with that in mind when the time comes. About the 8th and 22nd of each month are pay days in the mills. We make our discount day for that section follow right after, when they can pay their power and light bills for a little less. And we feature our simplest and least expensive models.

"We try to keep the appliances on demonstration going all day. People usually have to stand in line for some minutes on discount days; the sight and the smell of good cooking is potent stuff."

All kinds of people come, added the floor supervisor, varying at odd times with the section of the city being entertained, and often it's difficult to tell whether they've come in to pay a bill or just to look around. When the store is in doubt they go right ahead and get the customer interested in some appliance anyway.

"Even if they have one," he pointed out, "we can't go wrong. An old waffle iron taken down from the shelf because of a good demonstration here boosts the load for us just as much as a new one."

HOW DEMONSTRATIONS WORK

While Mr. Harries was answering a phone call I had a chance to ask a few questions of the girl who does the demonstrating.

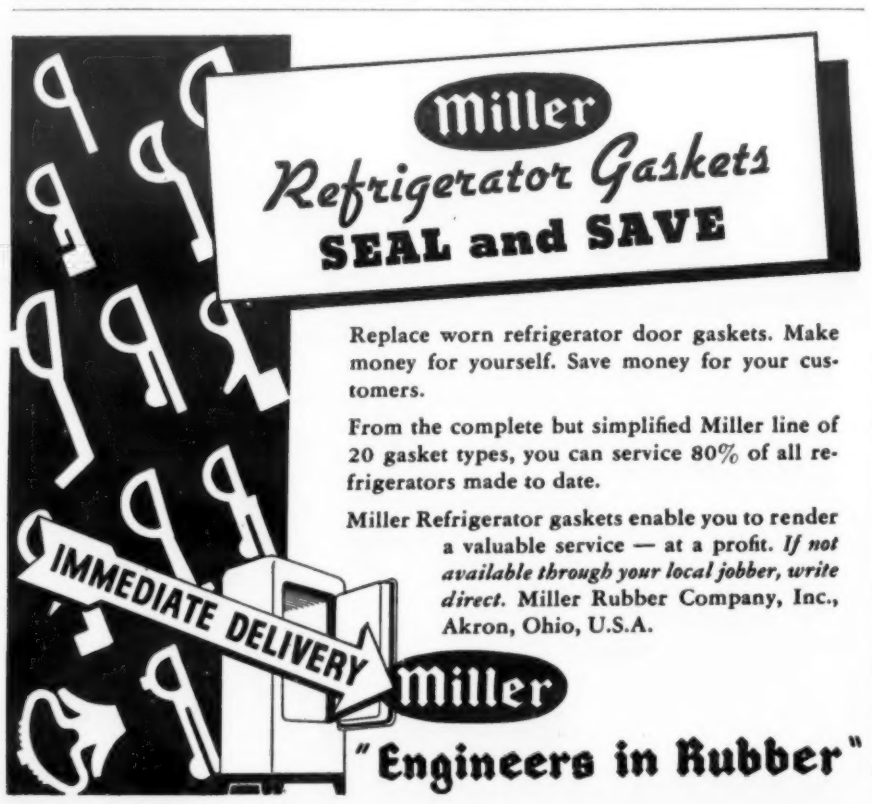
"We demonstrate a different appliance every day," she explained. "On heavy days I stand inside the oval counter over here and move from one appliance to another as people ask about the different ones. All the cooking is done with just one, though, for that day.

"Small appliances come up the best after special newspaper promotion. But it's my job to keep the cooking going whenever people come in any numbers. Coffee and small cakes are a godsend for all of us—the sales force included—on heavy days.

"As far as variety goes, we can turn out anything from strawberry shortcake to a turkey dinner.. Today I've been trying some waffle iron cookies. Anything new or different goes—it doesn't have to be intricate. And we have recipe books to give away after demonstrations."

Mr. Harries rejoined us. "We do most of the promotion on small appliances right here in the store," he added to her story. "In the first place there's not so much profit for the field man to spend his time with them. And they can be demonstrated much more effectively against a complete setting.

"You can't do that with the larger items. A refrigerator has to be sold on solidity and size. A family of four, for instance, needs a 6-ft. box. We have three prices in that size: $165, $192, $214. A family of a certain size needs one certain box; you can't afford to shift that around. We carry three price models for that reason."



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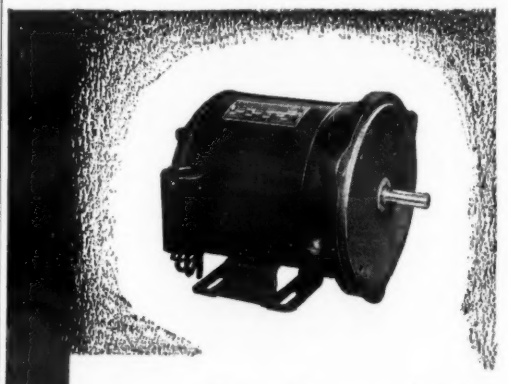

Reasons Why Wagner Motors Are Preferred for Refrigeration and Air-Conditioning Equipment

1 2 3 4 5 6 7

They are reliable. All motor parts and completed motors are carefully tested to meet exacting specifications according to the highest electric motor standards—an assurance to users that Wagner motors are reliable, free from defects and will last a good long time if properly used.

They are economical. Actual tests show that Wagner motors consume very little electric current, do not require much care, and operate smoothly and easily under all types of load conditions.

They will give satisfactory service. Wagner motors of today are the result of constant improvement in their mechanical design and efficiency, gained by 45 years of experience in building and designing motors for industry and the home. These years of experience have enabled Wagner's engineers to determine the characteristics of motors that are best for satisfactory service.

They can stand rough treatment. Wagner motors have rolled-steel frames — strong, rigid—will not get out of alignment—unbreakable.

They require very little attention. The life of motors depends upon the condition of operation to which they are subjected and the care they receive. Wagner motors are so constructed that wear between moving parts is reduced to a minimum. In addition, Wagner motors are equipped with large oil wells and have special lubrication systems so that only periodic oiling is necessary.

They are well-designed. Due to precision of manufacture, careful selection of materials and parts, and intelligent engineering, Wagner motors have all the features that contribute to efficiency, and yet are unusually compact in design.

Convenient service facilities. Wagner maintains 25 branch offices, warehouses, and service stations in all parts of the country. Each branch carries a complete stock of parts available for immediate shipment. Thus, when there's trouble with any type of motor, Wagner can give better and quicker service.

The above are just a few of the many reasons why Wagner motors are preferred. Many motor buyers prefer Wagner motors because they know that the Wagner line is so diversified in types and ratings that they can get, without special designing, exactly the right motor for their job. Others prefer Wagner motors because they like the cooperation and helpful assistance the Wagner sales-engineers give them when solving their power-drive problems.

When considering your next motor application or installation problem, avail yourself of Wagner's service. Wagner engineers will be glad to work with you and help you select the correct motor for your job. Descriptive literature will be sent upon request.

MS 137-1M

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, U.S.A.
MOTORS • TRANSFORMERS • FANS • BRAKES

THE NEWSPAPER OF THE INDUSTRY

AIR CONDITIONING AND REFRIGERATION NEWS

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Copeland Enters Laundry Field With 7 Washers

Present Merchandising Setup to Handle New Home Appliance Line

DETROIT—Copeland Refrigerator Corp. will enter the home laundry equipment field with a line of five wringer and two spinner model washers, to be merchandised under the Copeland name and through the company's existing field organization and distributors, it was announced here last week.

The new laundry equipment is being added to round out the line of home appliances now available to distributors and dealers, Copeland officials announced. Advertising and promotional materials for distributor-dealer use are now being prepared.

Spinner models of the new Copeland washers have a roto drive, and are built of heavy 18-gauge steel, with both exterior and interior of vitreous porcelain enamel. Washer tub has a capacity of 18 gallons of water, with 8 lbs. of dry clothes capacity.

Agitator fins are so designed as to give maximum action near the middle of the tub, where most clothes float during the washing process, for quicker cleansing as well as minimum chance of injury to fabrics.

Washer is filled automatically through use of a flexible hose, furnished with the machine, and water for rinsing is fed into the spinner compartment in the same way. The tub is emptied through means of a flexible exhaust hose, which also takes care of the water removed from the clothes in the drying operation.

Wringer models, constructed of the

(*Concluded on Page 2, Column 3*)

San Antonio Utility Conducts 'Parade' Of New Models

SAN ANTONIO, Tex—With the cooperation of dealers and distributors, San Antonio Public Service Co. is conducting a "Parade of Modern Refrigeration" during March and April, in connection with the showing of 1937 product lines.

In the campaign, spring showings of new refrigerators are presented in the manner of a parade, with complete lines of two makes holding the center of the Public Service Building stage for a week, until all 10 lines merchandised in the city have been displayed.

Opened March 15 to 20 with a display of General Electric and Westinghouse models, the "parade" continues with Frigidaire and Coldspot at center-stage from March 22 to April 3.

Following will be Norge and Leonard, April 5 to 10; Electrolux and Crosley, April 12 to 24, and Kelvinator and Stewart-Warner, April 26 to May 1.

The utility is backing the showings with an advertising campaign utilizing newspapers, radio, screen and bus cards, while cooperating dealers and distributors are tieing-in with advertisements of their own.

Spiegel to Head Servel Sales in Cincinnati

CINCINNATI—C. A. Spiegel has been appointed sales manager for Servel, Inc., in this district, according to George S. Jones, Jr., vice president and general sales manager.

Mr. Spiegel formerly was rural sales promotion representative for Servel, with headquarters in Evansville. He has been with the company since 1928.

Committee Named To Draft 'Model' Code for Detroit

DETROIT—Cooperation of the Refrigeration Supplies and Parts Manufacturers' Association has been sought by city officials in drafting for Detroit a refrigeration code which, it is hoped, will serve as a model for other cities throughout the country.

At the request of Halstead H. Mills, chief safety engineer of the city of Detroit, J. D. Colyer, vice president of Wolverine Tube Co. and president of the parts manufacturers' association, has appointed a committee of seven to draw up a refrigeration code for Detroit covering construction, installation, and operation.

On the committee, in addition to Mr. Colyer, are: George B. Bright, president of George B. Bright Co. and past president of the American Society of Refrigerating Engineers; F. J. Gleason, executive secretary of the parts manufacturers' association; C. A. Hill, engineer of Mueller Brass Co., Port Huron, Mich.; E. A. Siebert, director of service, Kelvinator division, Nash-Kelvinator Corp.; O. F. Stauder, manager of the Detroit branch of York Ice Machinery Corp., and D. D. Wile, chief engineer of the refrigeration and air-conditioning division of Detroit Lubricator Co., and vice chairman of the Detroit section of American Society of Refrigerating Engineers.

At its first meeting, scheduled for Tuesday, March 30, the committee was to have as guests Mr. Mills and F. M. Cockrell, publisher of AIR CONDITIONING AND REFRIGERATION NEWS. After dinner in the Wardell hotel, initial conference was to be held in the home of the NEWS.

The present Detroit city code became an ordinance in 1915, and several changes are contemplated in the proposed new regulations.

Members of the city safety engineering staff, in drawing up a skeleton code, have considered such things as solder specifications, panic conditions, location of condensing units, restrictions on toxic and non-toxic refrigerants, specifications of emergency relief lines, and minimum wall thicknesses of refrigerant lines.

In an effort to arrive at a "model" code, committee members will study measures recently enacted or now under consideration in several cities throughout the country. Codes now on hand include those of American Standards Association, City of Chicago, City of New York, and City of Washington, D. C.

According to present plans, the manufacturers' committee will hold

(*Concluded on Page 2, Column 1*)

50 Members in Association of Parts Makers

Wide Variety of Parts Represented in Membership

DETROIT—A total of 50 manufacturers are now members of the Refrigeration Supplies and Parts Manufacturers' Association, it was reported last week by Frank J. Gleason, secretary of the association.

A number of other applications for membership are pending, Mr. Gleason stated. Present membership is as follows:

Acme Industries, Inc., Jackson, Mich.; Alco Valve Co., St. Louis; American Injector Co., Detroit; Ansul Chemical Co., Marinette, Wis.; Automatic Products Co., Milwaukee; Bonney Forge & Tool Works, Allentown, Pa.

Bridgeport Brass Co., Bridgeport, Conn.; Bush Mfg. Co., Hartford, Conn.; Chicago-Wilcox Mfg. Co., Chicago; Cutler-Hammer, Inc., Milwaukee; Dayton Rubber Mfg. Co., Dayton; Detroit Lubricator Co., Detroit; Duro Metal Products Co., Chicago; R. & H. Chemicals Dept., E. I. du Pont de Nemours Co., Wilmington, Del.

E. Edelmann & Co., Chicago; Electrimatic Corp., Chicago; Fedders Mfg. Co., Buffalo; Fredericksen Co., Saginaw; Fulton Sylphon Co., Knoxville, Tenn.; L. H. Gilmer Co., Philadelphia; Henry Valve Co., Chicago; Hinsdale Mfg. Co., Chicago.

Imperial Brass Co., Chicago; Jarrow Products Corp., Chicago; Kellogg Compressor & Mfg. Co., Rochester, N. Y.; Larkin Refrigerating Corp., Atlanta, Ga.; Jas. P. Marsh Corp., Chicago; Maurey Mfg. Co., Chicago; Mayson Mfg. Co.,

McIntire Connector Co., Newark; Miller Rubber Co., Akron, Ohio; Minneapolis-Honeywell Regulator Co., Minneapolis; Mills Novelty Co., Chicago; Mueller Brass Co., Port Huron, Mich.; Peerless of America, Inc., Chicago; Penn Electric Switch Co., Des Moines, Iowa; Perfection Refrigeration Parts Co., Chicago.

Ranco, Inc., Columbus, Ohio; Rotary Seal Co., Chicago; Square D Co., Detroit; Superior Carbon Products Co., Cleveland; Tagliabue Mfg. Co., Brooklyn; Tecumseh Products Co., Tecumseh, Mich.; Temprite Products Corp., Detroit; Victor Mfg. & Gasket Co., Chicago.

Virginia Smelting Co., West Norfolk, Va.; Wolverine Tube Co., Detroit; Zenith Carburetor Co., Detroit.

ACMA February Report Shows 130% Increase

WASHINGTON, D. C. — Installed cost of equipment sold by members of Air Conditioning Manufacturers' Association in January and February totaled $14,512,000, an increase of 165% over the $5,471,000 sold in the first two months of 1936, reports William B. Henderson, executive vice president.

February topped January, totaling $7,360,000 as against $7,152,000, and an increase of 130% over the $3,200,000 reported by the association for February, 1936.

Montreal Dealership Operates Remodeled Home to Promote All-Electric Kitchens

MONTREAL, Que., Canada — Not content with selling more than 300 General Electric refrigerators last year, Modern Household Appliances, Ltd., has turned to the all-electric kitchen as a potential source of considerable additional business.

The company, which is also manufacturer's agent for a number of American firms, recently opened Airco Refrigeration Parts, Reg'd, as a model refrigeration jobbing concern. L. Arcand is president of the company, with H. M. Milne as sales manager, Paul Boucher as office manager, and A. Brown as representative in charge of the Quebec territory.

Operating of the company's "Domestic Planning Service," as the kitchen division is called, is separate from the original company, although actually it is a branch of the parent organization.

The Planning Service has a separate showroom, and operates a model home at 3826 Oxford, in one of the city's better residential sections. This home, an old residence remodeled into a truly modern one, is used to introduce the newest type of kitchen appliances. In addition, rooms are individually air conditioned.

In its promotion work, the company employs an architect who inspects the prospect's kitchen, draws rough plans on the job, and then goes back to the office and completes his design.

In addition, the company keeps an open type trailer in circulation in the residential districts, particularly those in which new homes are under construction or existing ones being remodeled.

Taking the appliances to prospects, instead of waiting for prospects to come in and seek them out, has proved effective in increasing individual and kitchen unit sales according to Sales Manager Milne.

Particularly has this been true on new construction projects, he adds. None of the interested parties are

(*Concluded on Page 2, Column 4*)

January-February Commercial Sales by Nema Firms Up 65%

28,754 Units Shipped by 15 Companies During 2-Month Period

DETROIT—Continuing the record-breaking pace set in 1936, sales of commercial refrigeration equipment by members of National Electrical Manufacturers Association to distributing outlets during January and February totaled 28,754 units, to exceed by 65% the 17,350 sold during the same period of last year.

Sales of commercial condensing units only during the two months were 18,693 units, an increase of 36% over the 13,613 units reported sold by the 15 Nema companies during January and February of 1936.

January sales of all commercial products totaled 13,777 units, compared with 7,438 in 1936; and the month's sales of commercial condensing units reached 9,515, against a total of 6,321 during the month last year. For February, all-products sales were 14,977 units, compared with 9,912 in the month during 1936, and condensing unit sales totaled 9,178, well over the 7,292 for February last year.

In every department save three, 1937 commercial sales showed sizable gains over those for comparable months of 1936. Exceptions were all in the condensing unit classifications, where sales of 1-hp. condensing units were 1,843 in 1936 against 1,533 this year; sales of 15-hp. units 143 against 119 this year, and sales of 25-hp. units 57 against 40 this year.

This year's January-February sales in all other commercial branches, however, showed encouraging rises over 1936 figures. Bottle and pressure water-cooler sales for the period were 2,448 units, compared with 1,073 in 1936; ice cream cabinet sales totaled 2,984, against 655 for the months last year. Beverage cooler sales, 3,954, were almost double the 1,953 units reported sold in 1936.

Encouraging increases were shown in sales of air-conditioning equipment, self-contained and otherwise. Total conditioner sales for the two months totaled 1,590, compared with 471 for the same period last year. Most notable gains were reported in self-contained units, sales reaching 675 against 65 last year; and floor-type conditioners, in which sales totaled 359 units.

Only air-conditioning classification to show figures comparable with 1937 marks was ceiling-type cooling units, in which this year's sales totaled 359 units, against 217 during the same period of 1936.

Sales of condensing units under 1-hp. capacity showed marked increases during the months over 1936 totals. Units of less than ⅓-hp. size sold during the months totaled 3,881, compared with 2,683 during

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Experiments With Rats Demonstrate Benefits Of Air Conditioning

ST. LOUIS—Importance of air conditioning to healthful living is demonstrated in experiments with white rats just completed by the St. Louis Medical Society.

Selecting 20 pairs of rats, the society placed 10 pairs in an air-conditioned room, let the other 10 pairs live in ordinary St. Louis atmosphere. Second and third generations were born and died under the same conditions, while growth and weight of the rats was recorded, and their lungs studied under microscopes after their deaths.

Every rat subjected to the regular St. Louis atmosphere had grey, discolored lungs, blackened bronchial tubes, and carbon and other smoke by-product deposits on interior lung tissues. Rats living in air-conditioned quarters had normal, pink lungs, were fatter and sleeker, and raised healthier litters with fewer deaths.

Carraway-Byrd Buys Large Dallas Plant

DALLAS — Establishment of a $400,000 plant here for the manufacture of air-conditioning equipment has been announced by Thomas W. Carraway, president, and D. Harold Byrd, chairman of the board, of Carraway-Byrd Corp.

The company has purchased a seven-story building at Elm and Houston Sts. It will be remodeled and equipped with machinery for production of year-around systems which the company has had in development for the past three years, Carraway states. It is serviced by ample railroad trackage.

Carraway-Byrd equipment provides a compact system which eliminates the outside cooling tower, even for large commercial installations. In the new plant, present facilities will permit employment of 50 persons to manufacture the system in three sizes.

Under development at present is a unit conditioner for individual rooms and offices, and another for use in small suites or large rooms, or in multiple in homes and commercial installations. When tooling for this unit is completed, approximately 300 persons will be employed in the plant, Mr. Carraway forecasts.

Electrical engineer, scientist, and inventor, Mr. Carraway shared in the development of the first successful unit coolers, and while in the army installed plants for the government at Camp Holabird, Baltimore, and Camp Normoyle, San Antonio.

(*Concluded on Page 2, Column 2*)

Thompson to Distribute Carrier in Boston

BOSTON—W. L. Thompson, Inc., has been appointed distributor for Carrier Corp. in this territory.

J. P. Maloney is general manager of the distributorship. W. F. Kelley and E. F. Groves are also active in the firm's management.

Public Hearing on N. Y. Code Set for April 7

NEW YORK CITY—A public hearing on the proposed revision of the New York City refrigerating code will be held at 2 p. m. April 7, in Room 1013 of the Municipal building, announces Francis X. Giaccone, deputy fire commissioner of the Division of Combustibles.

Stewart-Warner Has Best Year Since '29

CHICAGO—Net income of Stewart-Warner Corp. and its subsidiaries for 1936 reached the highest level since 1929, according to the company's annual report issued last week.

The report showed a net income of $2,112,234, after deductions were made for depreciation, normal federal income taxes, and surtax of $141,730. This was equal to $1.70 a share on the 1,241,847 shares of capital stock outstanding, as against $1.39 a share on capital stock in 1935 when a net income amounting to $1,724,313 was reported. The net income in 1929 totaled $6,838,938, or $5.37 per share.

Sales for 1936 totaled $27,074,509, as against $20,479,164 in 1935. Sales to distributors and wholesalers ac-

(*Concluded on Page 24, Column 1*)

Seeing How Their Product Is Made

Iowa Grunow dealers got a chance to watch the manufacture of Grunow refrigerators recently when 200 of them were guests of the company and their distributor, Midwest-Timmerman Co. of Davenport and Dubuque, on a trip to Chicago. G. J. Timmerman and Ben Kerper of the distributorship were in charge of the party.

Detroit Committee Asks Suggestions on Code

(Concluded from Page 1, Column 2)

a number of preliminary meetings at which the skeleton code will be analyzed, section by section, and recommendations for changes and additions made and discussed.

Since it is anticipated that several preliminary meetings will be necessary before the code is rounded into final shape, active committee members were selected from Detroit area.

The committee, however, is inviting the suggestions and cooperation of other association members.

Byrd-Carraway to Manufacture Year-Around Systems

(Concluded from Page 1, Column 4)

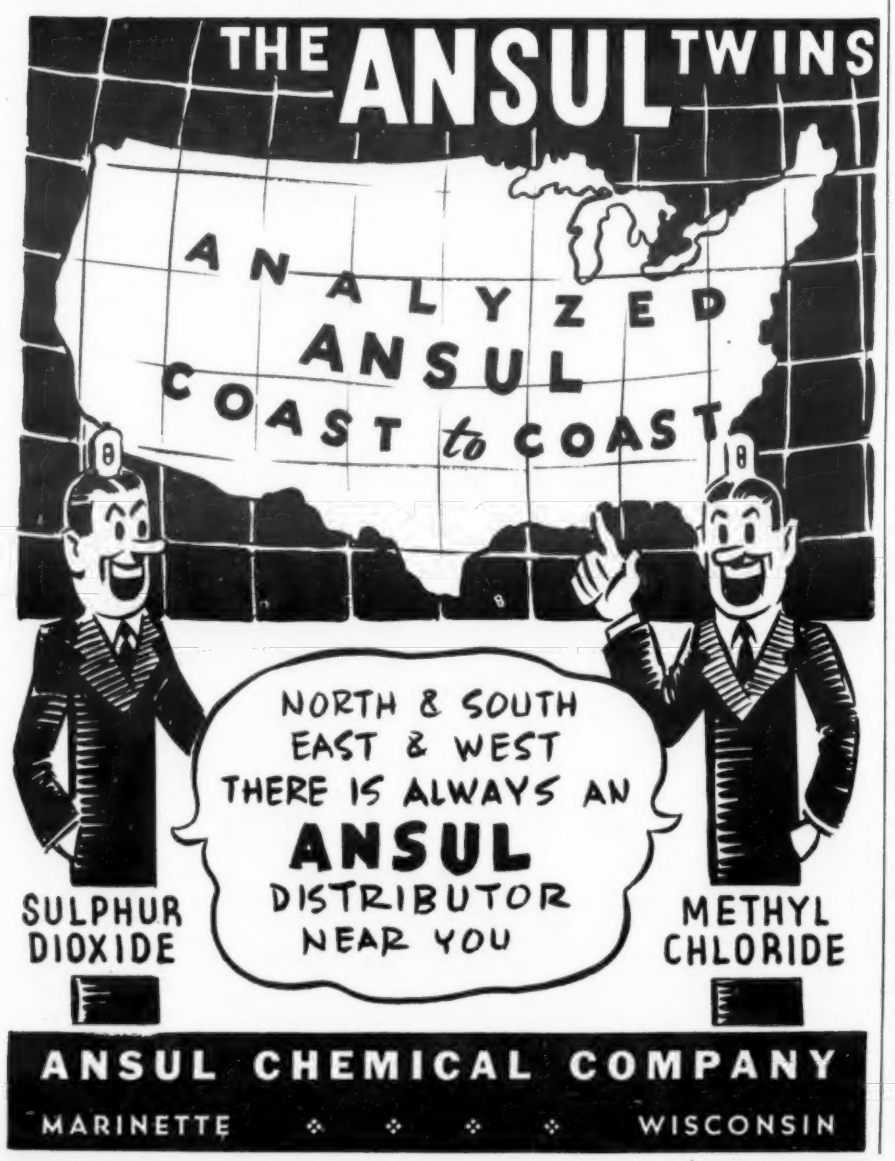
After leaving the army, he devoted most of his time to mechanical refrigeration, becoming manager of the air-conditioning division of the Grinnell Co., Providence, R. I., from which he resigned Jan. 1, 1934, to start his own company.

D. Harold Byrd, board chairman, is also president of the Independent Petroleum Association, and is well known here as an athlete, sportsman, and aviator, having traveled more than 1,000,000 miles in his own planes.

R. J. (Leo) Byrd, vice president of the corporation, became interested in air conditioning about five years ago, when he developed an air-humidifying device attached to an electric fan, which was later successfully applied to egg incubators and chick brooders.

Admiral Richard E. Byrd, a cousin of the chairman and vice president, is a member of the board of directors.

Other officers are: John Campbell, secretary and treasurer; Marion Church, general counsel; R. T. Gidley, assistant secretary and treasurer; S. T. Mendez, research engineer; Erle Racey, advertising counsel; and H. W. Scott, plant superintendent.



Kelvinator Spring Drive Backed by Radio Program

DETROIT—Kelvinator is launching an intensive spring sales drive in connection with its recently inaugurated NBC red network radio program, featuring "Prof. Quiz" and a nationwide Kelvin Home contest, with Kelvinator home appliances and Nash cars as secondary prizes.

The program, heard from 8 to 8:30 p.m. Saturdays, E.S.T., is being promoted nationally by the company through a series of advertisements on the radio pages of metropolitan newspapers, and similar copy in two succeeding issues of "Radio Guide."

Two contests are being run in connection with the radio program, the first a series of questions for use in the weekly broadcasts, and the second calling for the filling in of certain "missing words" in a 55-word statement concerning Kelvinator products, with a Kelvin Home as first prize. Six $25 prizes are being offered for winners in the weekly contests.

To enter the contest, individuals must obtain entry blanks and a Kelvin Home book from their local dealer. The book plays up advantages and ease of owning a modern home, as well as the different appliances which go together to make it up.

The company is suggesting that dealers adopt a two-way tie-in with the contest: (1) by organizing a powerful salesmen's activity, and (2) by organizing their showrooms as local headquarters for the campaign contest.

Use of the contest as a "door opener," it is believed, will stimulate outside canvassing activity by salesmen, as well as general consumer interest. Logical follow-up to the call is to invite the housewife into the store to see the appliances at first-hand, at which time a thorough demonstration may be made.

Suggestions in connection with using the dealer's store as local contest headquarters include the arranging of contest floor and "spot" displays, use of window trim materials, publicity and advertising in local newspapers, radio "spot" announcements, and keeping the store open Saturday nights until after the "Prof. Quiz" broadcast is over.

Contacting of preferred accounts, charge customers, and current term customers by telephone, telling them of the contest and urging them to call for entry blanks, is another method suggested.

Keeping contest booklets and entry blanks in a Kelvinator on the sales floor will accomplish a prime objective of the campaign—getting the prospect to look at the equipment, it is pointed out. Delivery of entry blanks by a salesman whenever possible is also advocated.

If contestants wish to buy an appliance before the contest is over, dealers may offer them that appliance free, should they later win. This offer is to eliminate possibility of an entrant's waiting until contest results are known before buying.

This offer, it is pointed out, may be used in many instances to "step up" the sale, by having the prospect buy a larger size unit, on the basis that if she does win one, she'll be getting a larger box free than the one given in the contest.

Copeland Lists Features Of New Washers

(Concluded from Page 1, Column 1)

same heavy-gauge materials, have water and dry clothes capacities similar to the spinner models, and the same agitator cleaning feature.

Units in this line are equipped with a ball-bearing wringer with a soft black rubber top roll, and a hard white rubber bottom roll, for maximum efficiency in extracting dirt and water from clothes. Of streamline design and constructed of cast aluminum, the wringer is made to prevent dripping or splashing of water over the sides.

A release bar atop the mechanism opens the wringer at a touch, for safety. Full wringing action is provided, whether clothes are fed singly or bunched up, because the soft top roll automatically adjusts itself to the shape of the garment, it is claimed.

Use of the wringer, it is claimed, saves washing time by making fewer rinsings necessary, as well as being easier on fabrics and eliminating broken buttons.

Longer Terms Would Aid Kitchen Sales, Firm Says

(Concluded from Page 1, Column 3)

overlooked—calls are made on contractors, builders, housewives, and even business men in their offices. If they're building or remodeling, they're prospects, the company believes.

All sales, individual appliance and kitchen unit alike, are financed through Industrial Acceptance Corp., Montreal. Terms do not exceed two years, regardless of the size of the contract.

This has had a tendency to deter larger sales, except to families in the higher income classes, Mr. Milue says. Help will come, he believes, through the Canadian government's recently inaugurated modernization plan, which would permit loans up to $2,000, with terms of three years at 3% interest.

Longer terms and lower rates, Mr. Milue believes, may help the company sell more kitchen cabinets and sinks, to say nothing of the boost it will give to financing of electric range and refrigerator sales.

The company also anticipates that this will help increase sales of Air Regulator kitchen fans, for which it has recently obtained sales rights covering the entire dominion.

Buhl's Sales Hold Up in Spite of Strikes

DETROIT—In spite of the decided braking effect of the existing strike situation in this territory, refrigerator sales of Buhl's Sons Co., Leonard distributor, have remained on a par with those of last year, according to C. W. Strawn, manager of Buhl's major appliance division.

Rountree Heads New C.I.T. Branch in Hartsville

HARTSVILLE, S. C.—To serve Chesterfield, Malboro, Lee, and the major part of Darlington counties, C.I.T. Corp. is opening an office in the Bank of Hartsville Building here Apr. 1, with R. D. Rountree, formerly of the C.I.T. branch in Columbia, as manager.

Helmrich to Address Detroit A.S.R.E. Meeting

DETROIT—George B. Helmrich, research engineer of Detroit Edison Co., will speak on "Fundamental Requirements of Air Conditioning" at the March meeting of the Detroit section of American Society of Refrigerating Engineers, to be held Friday, Apr. 9, at the home of AIR CONDITIONING AND REFRIGERATION NEWS.

Discussions by several members of the Detroit section will follow Mr. Helmrich's talk.

Copeland Sales Up 250% For 1936; Still Rising

DETROIT—Sales of Copeland Refrigeration Corp. increased 250% in 1936 over 1935, and the first quarter of 1937 is showing more than a 200% gain over the similar period last year, it was reported last week.

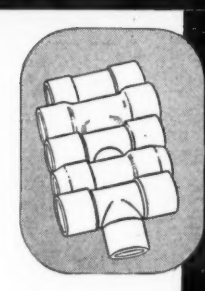
Morley Reports 9 Days' Sales Equal to Month Last Year

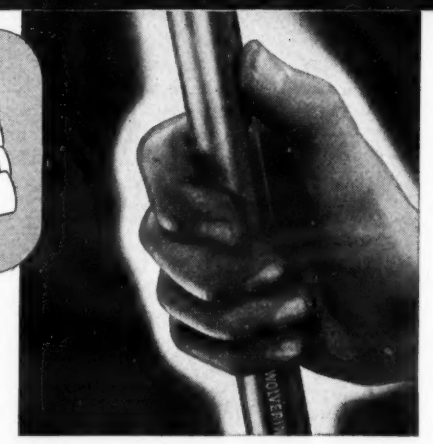
DETROIT—Sales of Morley Bros., local appliance distributor, for the first nine days of March, 1937, equaled sales for the entire month of March last year, according to Carl Crandell, appliance sales manager.

Morley Bros. has also taken on state-wide distribution of the Kadette line of midget radios.

WOLVERINE
COPPER TUBING

FITS ANY STANDARD FITTING





- product of

Craftsmanship

There's no trouble doing any job quickly with Wolverine Copper Tubing, and it doesn't matter what fitting you use (so long as it's to A.S.T.M. specifications).

But that's only one thing you'll like about Wolverine Copper Tubing.

The uniform quality, fine grain structure and bright clean finish are other reasons why you realize there is a copper tubing that is better than "just any tubing." To accomplish this, Wolverine refuses to manufacture and ship even one single length of Copper Tubing unless it conforms in every respect with the Wolverine standard of quality—a quality now being accepted as standard by the industry. Whether you buy it in straight lengths or in coils, this known quality is never lacking.

This is why Wolverine Copper Tubing is referred to as being a product of Craftsmanship.

Your Jobber stocks Wolverine Copper Tubing.

Wolverine TUBE COMPANY
SEAMLESS COPPER-BRASS-ALUMINUM
1411 CENTRAL AVENUE — DETROIT-MICHIGAN

Secluded Salesrooms Produce Sales for Denver Store

DENVER—Construction of two off-the-floor salesrooms in the refrigeration department of the May Co., leading department store here, has facilitated sales, cut customer runouts, and appreciably increased turnover, declares Department Buyer G. A. Herron.

Compo-board partitions were erected to block off a room 10x50 feet in the store's refrigeration section, located on the second floor. The enclosed space was divided to form twin salesrooms, each large enough to hold 12 refrigerators. In this way a separate display room is provided for each of the two lines which the company carries.

Each showroom has two open entrances—one at either end of the room. The walls inside the partitions are painted gray; exterior finish is in a soft cream color. In addition to the 12 boxes, each showroom contains moving displays, demonstrating equipment, and two upholstered chairs.

A number of floor models, placed outside the two showrooms, attract customers to the refrigeration department. The salesmen contact prospects in this outside section, and endeavor to draw them into either of the showrooms.

In the majority of cases this is a relatively simple matter, Mr. Herron states. The salesman takes advantage of the fact that the ordinary customer is shopping weary and the chairs in the showroom are soft.

Main advantage of the new setup, he claims, is that elimination of floor traffic allows the salesman to proceed with his sales story without interruption.

Potter Attacks Claims Of Ice Industry in Full Page Spread

BUFFALO—Challenging statements regarding "air-conditioned refrigeration" made in the ice industry's national radio program, A. R. Weber, Inc., Potter dealer, used a full page in the March 24 *Courier-Express* to demand, in "An Open Letter to the Ice Industry," that "the whole truth" of the situation be told.

"For months you have been telling the public what constitutes effective food preservation, and what a refrigerator must do to perform up to those standards," the copy reads.

"You say 'Cold alone is not enough' . . . that in refrigeration foods must be guarded not only against spoilage but also against rapid drying out, loss of their nutritive juices, and the mingling of food flavors. You also stress the value of proper humidity in accomplishing these results.

"These statements, so far as they go, are quite correct.

"But you have no right, through adroit wording, to mislead the public into believing that these important results can be obtained only in buying an ice refrigerator.

"That is not the truth and you know it!

"You know, as well as we, that for many years past, these unquestioned essentials in food preservation have been enjoyed in thousands of American homes through the use of Potter 'Air-Conditioned' refrigerators; and that the Potter is an elecric refrigerator with all the benefits of electric refrigeration . . . not an ice refrigerator.

". . . Upon what grounds, then, can you reasonably justify your repeated distortion of fact? What hope have you that even a million dollars worth of advertising propaganda can blind the public to the fact that the overwhelming advantages of air-conditioned food preservation are available in electric refrigerators for the home?

"You talk, too, about the low purchase price of ice refrigerators. But you neglect to mention that over a period of years, the user will pay out several times the refrigerator's initial purchase price for ice alone.

"We have tried to write this message so that all who read it can get a true understanding of the subject without having to guard themselves against things left unsaid or against clever manipulation of the truth. In our own advertising of Potter refrigerators, we have tried always to follow these principles. We shall continue to do so.

". . . We have no tolerance for sales methods, either spoken or printed, that present distorted facts so cleverly that the lay mind is tricked into believing them as unadulterated truths. In our opinion, the public is entitled to the truth, the whole truth."

Miles Estimates '37 Sales Of 500,000 Ranges

DETROIT—Sale of nearly 500,000 electric ranges in 1937, an increase of approximately 53% over 1936 sales, is predicted by Pierre L. Miles, sales manager of the Kelvinator range and water heater department.

Ingersoll Plans Enameling Dept.

CHICAGO—Ingersoll Steel and Disc Division of Borg-Warner Corp. is planning the addition of a porcelain enameling department to its plant.

Consumer's Power to Build Plant Near Jackson

JACKSON, Mich.—As soon as engineering surveys to determine a proper site are completed, Consumer's Power Co. will build a huge steam electric-generating center on the Kalamazoo river, M. Wilson Arthur, vice president and assistant general manager, announced last week.

Construction of the plant will start as soon as the site is chosen and plans drawn, Mr. Arthur said. Equipment has been purchased. The development will provide for a generating center with an ultimate capacity of 275,000 hp., according to present plans.

G-E Statisticians Make Estimate on '37 Market

SCHENECTADY—Based on industry sales for 1936, General Electric Co. statisticians predict that during 1937, in the average community of wired homes, one home in every 12 will buy a refrigerator, one in every 18 will buy a washer, one in every 24 a vacuum cleaner, one in every 70 an electric range, one in 137 an ironer.

Huddle-Roach Distributes Westinghouse Line

BOGALUSA, La. — Huddle-Roach, Inc., newly organized here, will distribute Westinghouse products in Washington Parish and southwestern Mississippi. Members are Hunter Huddle and F. E. Roach, Orange, Tex.

Hotpoint Dealer in Denver

DENVER—Western Supplies Co. here has been named Hotpoint electric refrigerator and washer dealer.

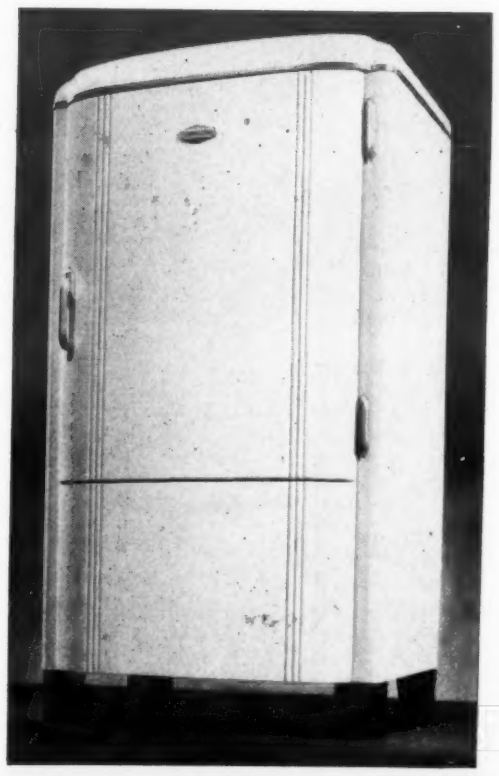
COPELAND

ANNOUNCES

A COMPLETE LINE OF WASHERS

7 MODELS

$54.95 to $129.95



And if you are interested also in joining the ever-increasing number of distributors and dealers who are selling the 1937 Copeland Electric Refrigerators, ask us to give you the facts about this division of our business.

. . . with the most attractive selling set-up in the industry

• Here is the proud result of many months of careful planning—for when we decided to enter the washing machine field we knew that to attract dealers, we would have to create a product so beautifully styled, so excellently built and so favorably priced that it would sell easily.

More, we knew that we must offer dealers an ideal franchise which provided for profitable discounts, liberal financing plans and strong advertising and merchandising support.

So that you can judge how completely we have accomplished all this, we invite you to write or wire us for full details. Address: Mr. J. D. McLeod, General Sales Manager, Copeland Refrigeration Corporation.

COPELAND

REFRIGERATION CORPORATION, DETROIT, MICH.

A DALLAS E. WINSLOW INDUSTRY

PIONEER MANUFACTURERS OF REFRIGERATION

20 Appliance Firms Display at Toledo Refrigeration Show

TOLEDO—Twenty electrical appliance distributors and dealers had displays at the Fourth Annual Refrigeration Show here recently.

Exhibitors included Electric Range & Equipment Co., Frumkin Tire Co., J. W. Greene Co., The Gas Co., Lang Appliance Co., Lamson's department store, LaSalle & Koch department store, the Lion department store, McIntire's, F. W. Myers & Son, Rahla Electric Shop, Schwartz-Norge Co., Sears, Roebuck & Co., Toledo Edison Co., Tiedtke's, Tullis & Sizemore Appliance Co., United Music Store, Usher Furniture Co., Chandler Hardware Co., and Your Furniture Store.

Stewart-Warner Radio Program To Feature Refrigerators

CHICAGO — Stewart-Warner Corp. will feature its line of household electric refrigerators on the Horace Heidt Alemite Brigadiers CBS radio program for a 10-week period, beginning Apr. 3.

Gift Vases Aid New Dealer In Clinching Sales

MEMPHIS, Tenn.—Giving small silver vases as souvenirs to interested prospects is the method being used by Armstrong, Inc., furniture store here, to secure business for its new refrigeration department.

The company's salesmen obtain prospects through canvassing and following up leads. When a prospect appears interested, the "gift" provides the salesman with a wedge for clinching the sale on the first contact call, and for obtaining leads to new sales.

York Supply Names 5 Leonard Dealers in 4 Ohio Cities

DAYTON—Five new dealers in four cities have been appointed by York Supply Co., Leonard distributor, according to Chelsea York.

New dealers and their locations are: Automotive Engineering Co., Springfield; Eden Service Co., Springfield; Jim Reigal, Greenville; Piqua Electric & Sporting Goods Co., Piqua; Piqua Electric & Sporting Goods Co., Troy.

New G-E Division to Promote Miscellaneous Appliances

BRIDGEPORT, Conn.—Formation of a new sales section for miscellaneous household appliances has been announced by D. C. Spooner, Jr., manager of the General Electric household appliance division here.

The new section will be responsible for certain devices developed from time to time by the G-E research laboratory and engineering groups, for which there is no immediate large developed market. In the new section, such appliances will be given individual attention and a full opportunity for market exploitation.

The General Electric comforter and floor polisher have been assigned to this section. Roy W. Johnson has been appointed sales manager.

Two appointments in the appliance division have also been made.

J. V. White, formerly distribution manager of the advertising service division of the G-E appliance and merchandise department, has been assigned to the home laundry equipment sales section. He will be succeeded in his former position by W. H. Collins.

- HOW SUCCESSFUL DEALERS OPERATE -

Leading Westinghouse Retailers Place Emphasis on Consistent Canvassing

By T. T. Quinn

The following "How I Did It" stories from leading Westinghouse refrigerator salesmen and dealers are part of the series collected by NEWS staff members during the annual Westinghouse convention for its "Quota Buster" salesmen.

'Get 'Em Into the Store' Is Leresche's Motto

Getting the housewife into the store, and then giving her a detailed demonstration with the use of all available factory material, is what G. H. Leresche, of Hill & Leresche, Wilkinsburg, Pa., credits with enabling him to sell 355 Westinghouse refrigerators last year.

"Home demonstrations are all right," says he, "but you can work much more effectively if you get the prospect into your store. At least, we can. We have every available factory demonstration material—the cutaway unit, the three-pronged froster demonstrator—and we find that these things drive home the quality story better than anything we can say."

Sales this year, Mr. Leresche states, are about 25% ahead of last. Encouraging, too, is the fact that more sales are in the deluxe equipment line, with three 9 cu. ft. Aristocrat units already numbered among 1937 business.

In charge of the Hill-Leresche appliance department is L. C. Rich, and under him are four part-time men, who work nights and in their other spare hours.

Best salesman of the lot, in Mr. Leresche's opinion, is a youngster of 69 years who works regularly for the Westinghouse Air Brake Co. Among his friends and fellow workers this man finds plenty of prospects; and the company loans him a car for bringing them into the showroom and taking them home again and a regular employe helps with the close.

Another top-notch part-time man is Ward Briggs, former state amateur boxing champion who works in the McKeesport territory. He had quite a reputation in his fighting days, Mr. Leresche says, and after he retired from active ring warfare he taught boxing for some time. Former pupils and fans remember him, and buy.

If you want to sell 'em, you've got to get 'em into your showroom. There's no deviation from this rule of successful selling, Mr. Leresche says. After you have them in your store, he contends, you can show them selling points which otherwise you can only talk about.

Having the product there in front of them keeps their interest alive, he says. With most sales running from 7 to 9 cu. ft. models, you can sometimes "sell up" the prospect to a size larger than she originally intended buying—but you have to have the merchandise to show her. That's why Mr. Leresche believes in keeping a full line on display at all times.

He keeps the showroom open at night too, and many of his 1936 sales were closed after dark, he says.

Here's a trick Mr. Leresche uses in his demonstration. He keeps the refrigerator door closed, and opens it only when he's at that part of the sales story. It keeps the prospect's mind from wandering, he finds. And he starts his presentation on his best model. After a person sees the best, the lower priced ones never look quite as good, he says—which may account for his large percentage of deluxe model sales.

Trade-ins? There's a way to handle them, Mr. Leresche says. On most old units, the housewife usually has an exaggerated idea of its trade-in worth. So what? He lets her try to sell it herself.

"See here," he says, "maybe your old refrigerator is worth $25. I'll allow you $15 for it, in trade for a new box. You keep the refrigerator, sell it yourself—and give me $15 out of what you get for it. The rest is yours for making the sale."

On the used refrigerator he does take in, Mr. Leresche's policy is to sell them at a small profit, with no guarantee other than that the unit is operating properly at the time it's delivered. A good market in his territory, he says, is among the landlords of low-rent apartments.

Trimble Finds Success As a Refrigerator Specialist

Being a "specialist" on electric refrigerators enabled J. Trimble of Montgomery Electric Co., Silver Springs, Md., to earn a place among the top 120 Westinghouse salesmen in the country last year.

Silver Springs is just outside Washington, D. C., and there's considerable competition from the larger dealers, Mr. Trimble says. His company, a suburban store, has found a way out by making its four salesmen concentrate on selling a single appliance.

Mr. Trimble, for instance, sells only refrigerators. Another man specializes on washers, another on electric ranges, and a fourth on oil burners.

In their rounds, the men naturally bump into prospects for one of the other appliances. When they're refrigerator prospects, the names all go to Mr. Trimble, and he does the follow-up and makes the sale, if possible.

The man who turned in the prospect's name gets a commission of 3%, after the sale is made. And the same method applies to sales of washers, ranges, and oil burners.

Working such a system, Salesman Trimble finds, increases sales efficiency, because the actual selling job is handled only by a man who knows the product from A to Z, and there's no fumbling from the time the name comes in to the time the sale is made, or the prospect lost.

Working only on leads of this type, Mr. Trimble says, keeps him pretty busy. But the store has another profitable source—users—and pays for good names with cash or merchandise, whichever the user prefers.

Still another good source of leads is the company's three service men, who make regular calls on all users and other owners of appliances in the territory. The men are trained to ascertain the owner's wants, and, by adroit questioning, to bring them out.

Suppose, for instance, that the housewife's refrigerator needs repairing, and that it's a unit with several years of service behind it. The service man will suggest trading it in for a new unit—and then notify Mr. Trimble of what he's done.

Take another case, where the appliance is new. When he calls to check up on it, the service man will ask the housewife if any neighbors have seen the equipment, and what comments they made about it. If it sounds the least bit encouraging, the neighbor's name, too, is passed on to Mr. Trimble.

If a sale is made on the service man's tip, he gets a commission of 2%. Reason he's not paid 3%, the same as other salesmen get, is that all service men are on a weekly salary of $25—and the company figures they don't need as large a bonus as the men who work on commission alone.

Most of the company's advertising, Mr. Trimble says, is of the direct-mail variety, including envelope stuffers which are enclosed with customers' monthly statements. With all the leads obtained in this way, and through fellow salesmen and service men, Mr. Trimble is kept so busy that he says he doesn't have any time at all for canvassing.

Jefferson Does Good Job With Kerosene Units

One of life's most perplexing problems to W. B. Jefferson, manager of the Jefferson Radio Co., Washington, N. C., is that people are always forgetting that he lives in the "Big Washington," (North Carolina) and insist on sending his mail to Washington, D. C.

Despite the fact that this common secretarial foible almost kept him from hearing about it in time, Mr. Jefferson managed to sell enough Westinghouse refrigerators last year to qualify him among the nation's best Quota Busters.

In a town of 10,000, and a trading area of approximately 15,000, Mr. Jefferson and three salesmen do a right smart job on Westinghouse electric and Electrolux kerosene refrigerators. Washers of both types also are merchandised by the quartet.

The men work on a flat commission of 10%, and get protection on all leads they originate. They sell all appliances—and business is becoming so good that Mr. Jefferson started another man on the job during the week he was at the convention.

Most leads are obtained, says Mr. Jefferson, by using the users, although salesmen manage to do quite a bit of canvassing, on the side.

Washington, as the population figures indicate, is in the center of a farming community, where power lines are not too extensive—so kerosene units have been selling well in some of the smaller towns, and the farming areas, where electric power either is not available or is too costly for extensive use.

It doesn't cost a lot to operate the kerosene units, Mr. Jefferson says, and that's what's sold a lot of them in his territory—despite the fact that, for all-around purposes, they're not nearly so convenient as electric refrigerators.

Power rates are being lowered in the territory, and with the addition of more customers to the lines, Mr. Jefferson looks for a rise in electric refrigerator sales, but not too much at the expense of kerosene units.

"Some people just naturally like to use them," he puts it.

Trade-in electric refrigerators are not a problem as yet, because, as he explains it, use of that type of appliance has not reached the heights there that it has in lots of other sections of the country.

Because it does electrical contracting work, Jefferson Radio has become interested in the air-conditioning possibilities of the territory. To the present, the company has done little of its work independently, however, cooperating for the most part with the utility on a commission basis. The same procedure is followed regarding commercial refrigeration work.

Liberal But Profitable Policy On Trade-ins Aids Valmassei

Consistent outside canvassing and giving good trade-in allowances on ice boxes are two of the things that spell increased refrigerator sales for Valmassei Bros., Monroe, Mich., hardware firm and Westinghouse dealership, according to Ted Valmassei, who sold 127 units during 1936.

"The reason we can give generous allowances on ice boxes and still make money," says Mr. Valmassei, "is because there is a heavy demand for the ice boxes among cottagers in the many summer resort colonies close to Monroe."

Established in Monroe for eight years, the hardware firm is owned by Ted Valmassei and his brothers, Harry, Dan, and Adam. It has been selling Westinghouse refrigerators for past three years, and Mr. Valmassei says that the firm now has 300 users—which represents an average of 100 sales per year.

The six salesmen who are employed by Valmassei Bros. get most of their leads from consistent house-to-house canvassing.

Thirty Westinghouse models are kept in the hardware store's floor display, which also contains Maytag washers, Philco, Grunow, and Detrola radios, Globe stoves, and a general line of hardware.

Approximately 20% of his refrigerator sales are cash deals, Mr. Valmassei says. The firm handles its own accounts on time payment sales, charging an 8% financing charge. The average retail price per sale is around $200, he declares.

In addition to establishing direct contact with Monroe residents through its canvassing salesmen, Valmessei Bros. uses newspaper, theater, bill board, and direct mail advertising to stimulate floor traffic.

Why Gamble?
USE AERO
SELF-ALIGNING SEALS
Seat and Seal Immediately!
Fully Guaranteed!
Easy to Install!
Save Time, Trouble and Money!
"THE LONGER THE WEAR - THE BETTER THE SEAL"
COVERED BY U.S. PATENT ALLOWED OCT. 26TH 1936 OTHER PATENTS PENDING
AERO PRODUCTS CORPORATION
36-08-34th St., Long Island City, New York

Demonstrate the JEWETT alongside any other refrigerator
Prove to your prospects the Jewett Humidifier keeps fresh vegetables 40% fresher.
The Jewett has everything that every one looks for in a refrigerator of outstanding quality. And in addition it features the exclusive Humidifier Compartment that keeps fresh vegetables 40% fresher. By comparison, by demonstration the Jewett can get the business for you in the toughest competitive market. Write or wire for the facts and exclusive franchise proposition.
THE JEWETT REFRIGERATOR CO., INC. BUFFALO, NEW YORK
Established 1849
Consider these almost unbelievable results
Celery, by weight, lost 2% in Humidifier Compartment — in regular compartment 63%. A difference of 61%.
Lettuce, by weight, lost 4% in Humidifier Compartment — in regular compartment 27%. A difference of 23%.
Cauliflower, by weight, lost 4½% in Humidifier Compartment — in regular compartment 27½%. Difference of 23%.
Parsley, by weight, lost 2% in Humidifier Compartment — in regular compartment 44%. Difference of 42%.
Endive, by weight, lost 1½% in Humidifier — in regular compartment 40%. Difference of 38½%.
JEWETT

13 Refrigerator Makes Shown At Cincinnati Exposition

CINCINNATI—Thirteen dealers and distributors displayed as many makes of refrigerators at the Cincinnati Electrical Association's fifth annual Electrical Progress Exposition here recently.

Exhibitors reported the greatest attendance and largest number of sales in the show's history.

The following firms had displays at the exposition: Appliances, Inc., Fairbanks-Morse; Auto-Rad Supply Co., Sparton; Barger, Inc., General Electric; Crosley Distributing Corp., Crosley; Dietz Distributing Co., Stewart-Warner; Frigidaire Corp., Frigidaire.

General Electric Supply Corp., Hotpoint; Graybar Electric Co., Kelvinator; Griffith Distributing Co., Grunow; Harten-Knodel Distributing Co., Norge; Schneider-Schott Co., Gibson; Schuster Electric Co., Leonard; Tafel Refrigeration Co., Inc., Westinghouse.

Rietz Sees Huge Market For Manufacturers in Rural Electrification

NEW YORK CITY—More than half a billion dollars worth of new business to electrical manufacturers alone should result during the next 10 years from present plans for progressive rural electrification, declared G. A. Rietz, rural electrification specialist of the General Electric Co., at a luncheon meeting in the G-E building here on Mar. 19.

Government participation has sharpened the interest in supplying the farmer with power, and this, together with the improved financial status of the farmer, should increase market opportunities many times, Mr. Rietz said. He added that electrical manufacturers now have an annual total available business of $35,000,000 from existing farms.

The speaker referred to the passage of the Rural Electrification Bill placing the REA on a 10-year basis, with $410,000,000 available to loan for the construction of power distribution systems. A total of $50,000,000 may be loaned for this purpose during the present period, ending July 1, and $40,000,000 may be loaned annually thereafter for nine years, Mr. Rietz pointed out. Additional funds for the purchase of wiring and equipment have been made available to the farmer at low rates of interest.

All this, said Mr. Rietz, is in addition to the active extension programs financed by private utilities which to date have resulted in the connection of about 800,000 farms and 2,500,000 other rural customers to electric service lines. On these figures has been made an estimate of one and a half million new customers in the next 10 years.

This estimate is conservative, Mr. Rietz thinks, because private utilities alone connected an average of 100,000 new farm customers per year from 1928 to 1931 inclusive.

"Contrary to the general impression, the farmers have the money to procure electric service," declared Mr. Rietz. "The total cash farm income for 1934 exceeded $6,000,000,000, and in 1936 it was one-third greater. Fifty-eight per cent of all farms are free of mortgage indebtedness. The ratio of farm debt to value is only 18%, which is much less than for most industries.

"A recent survey by the Rural Electrification Section of the General Electric Co., covering the average more progressive farm customer on lines of utilities operating in 11 states, shows an average electric-equipment investment, at retail prices, of $660 per customer. Records consistently show that the farm customer purchased from 250 to 350% more electric equipment than the city dweller throughout the depression.

"The need for educational work has always been evident," Mr. Rietz said. "It is based on the fact that no power company, public or private, can justify generally the extension of its lines into rural areas simply to provide electric lighting service.

"If farm lines are to be economically sound, and if the rates are to be reasonably low, the farmer must become a large user of household appliances. He must use electric power to pump water, grind feed, operate milking machines, and perform other important farm operations.

"Few farmers today realize the importance of this phase of the problem, yet we know from our field experience that when the average farmer becomes fully convinced of how much electric power can help him, he is more than willing to use it to full advantage."

Montgomery Ward to Build 3 Stores in Detroit Area

DEARBORN, Mich. — Construction will be started here soon on the first of three new stores which Montgomery Ward & Co. will build in the Detroit area, it was announced recently by company officials.

Contract for the first store, to be located at the southeast corner of Michigan Ave. and Schaefer road, has been awarded to W. E. Wood Co., Detroit. W. J. Phillips, Royal Oak, secured the plumbing, heating, and ventilating contract.

Other stores will be built at Grand River Ave. and Greenfield Road, and at the southwest corner of Gratiot and Lappin avenues.

The company also plans to expand its Royal Oak store to double its present size.

200 Detroit District Grunow Dealers Visit Factory

DETROIT—About 200 dealers in the territory of Specialties Distributing Co., local Grunow distributor, were guests of the distributorship March 24 on a trip to the factory of General Household Utilities Co., Chicago, according to Leonard Turnbull, of the distributorship.

Sponsored as a personal invitation from William C. Grunow, president of General Household Utilities, the trip was featured by visits to both of the company's Chicago plants, and a business meeting in the Cameo Room of the Hotel Morrison at which various factory officials, including Mr. Grunow, spoke.

To qualify for the trip, dealers must be regularly franchised, and have refrigerators on the floor.

Entertainment consisted of lunch at the Morrison's Cameo Room, and dinner at the Cafe Parisien.

New York Plans Housing Exposition in May

NEW YORK CITY — The 1937 North American Homes Exposition, this city's first major housing exhibit since 1929, is scheduled to be held at Madison Square Garden, May 12 to 23, with the cooperation of the FHA and the Manufacturers Housing Promotion Council.

Anticipating a post-depression home-building boom greater than that following the World War, the exposition's management, backed by 54 manufacturers and building companies, expects more than 200 exhibitors to present the newest in building materials, refrigerators, air conditioning, electrical appliances, heating apparatus, decoration, and other modern-home attributes to crowds that will total 250,000, according to advance estimates.

Three complete full-size houses and one modern city apartment will be included among displays to occupy the 92,000 sq. ft. of floor space ventilated by a new air-conditioning system.

According to L. Porter Moore and Capt. R. L. Purdon, co-directors of the exposition, the three houses will be an ultra-modernistic $50,000 steel-and-glass "House of Tomorrow," a colonial-style "House of Today," and an FHA small home in the $2,000 to $3,000 class built with the cooperation of the National Lumber Manufacturers' Assn. and the National Retail Dry Goods Assn.

Blackburn Joins California Metal Enameling Co.

SALEM, Ohio—M. E. Blackburn has resigned his position with Mullins Mfg. Co. here to become enamel superintendent for California Metal Enameling Co., Los Angeles.

12 Refrigerators, 4 Air Conditioning Units Featured in Wilmington Electrical Show

WILMINGTON, Del.—Exhibits of 12 makes of electric refrigerators and four air-conditioning units were featured at the ninth annual Refrigerator and Electrical Show recently held here under the auspices of Electrical Trades Association, Inc.

Thirty-five dealer-members of the organization and 15 manufacturers and distributors participated.

William L. C. Lang, president of the association, supervised plans for the show; John S. Reyburn was general chairman of the show committee. Other committee members included: Royal C. Hull, general co-chairman; George Reese, chairman; B. A. Allen and J. A. West, publicity committee; Charles Schnepfe and Leo Keil, floor committee; and William Frederick, in charge of finance.

Special committees were: oil burners, J. E. Workman and Francis Ponsell; radio, Louis H. Dougherty; refrigeration, Harvey H. Poole; appliances, Charles J. Schaefer.

Besides President Lang, officers of the organization are: George Tunis, vice president; Mr. Poole, secretary, and Mr. Frederick, treasurer.

Exhibitors included:

Braigers, Inc., (Hotpoint); Delaware Power & Light Co., (General Electric); L. H. Dougherty Co., (Kelvinator); Garrett, Miller & Co., (Universal); Gewehr Piano Co., (G-E); Morris Glantz Co., (Grunow); F. H. Gooding Co., (Sparton); Keil Motor Co., (Westinghouse, Electrolux, Carrier air conditioning); McAbee Piano Co., (Sparton).

Poole's Electric Stores, (Westinghouse); Reyburn Radio Stores, (Copeland); Raymond Rosen, (Kelvinator); Robelen Piano Co., (Kelvinator); Rumsey Electric Co., (Copeland); Sears, Roebuck & Co., (Coldspot); Stern & Co., (Frigidaire); Wesco, (Kelvinator); Wilmington Auto Co., (Frigidaire).

J. E. Workman Co., (Apex); Westinghouse Electric Supply Co., (Westinghouse); Wilmington Maytag Co., (Norge, Crosley); Wolhar Bros., (Sparton).

GOODYEAR

ENDLESS CORD V BELTS

JOBBERS: We are authorized distributors for Goodyear Replacement V Belts for Refrigerators and Washing Machines.

Immediate shipments from our large Detroit stock. Write us.

DETROIT RUBBER PRODUCTS, INC., 35 Parsons St., Detroit, Mich.

Look at these PLUS SELLING FEATURES!

GOODYEAR
MADE IN U.S.A.
V BELT
Elastic Envelope takes the wear . . . transmits load to the heavy cord section . . . protects carcass
High tension section
Heavy cord load carrying section in neutral plane
Reinforced compression section

1 Goodyear Replacement V Belts are made in a complete range of sizes to fit all standard makes and models of refrigerators, washing machines, water pumps, stokers, oil burners, beer pumps and light tool drives.

2 All Goodyear belts are endless cord construction, virtually stretchless—insuring longer life, maximum efficiency and quiet operation.

3 Tests prove Goodyear V Belts run up to twice as long as others without slipping or breaking.

4 With all standard assortments of Goodyear V Belts containing the most popular sizes you get a handsome three-color metal wall-display rack—a real aid to bigger sales.

THESE are the reasons why Goodyear Replacement V Belts are the most popular on the market—why they are easier to sell—and why you make more money with them. With the Goodyear line you have the correct belt for every customer—a true-fitting, true-running, long-lasting belt that makes friends for you. For full information and handy Application Guide telling correct Goodyear Belt for every appliance, call your jobber, or write Goodyear, Akron, Ohio, or Los Angeles, California.

Service-proved Goodyear products that make friends for you

FRACTIONAL H. P. V BELTS for single groove service on light machinery drives

EMERALD CORD V BELTS for multiple drives

Made by the makers of Goodyear Tires

THE GREATEST NAME IN RUBBER

GOODYEAR

REPLACEMENT ENDLESS CORD V BELTS

'Fortune' Magazine Tells Story Behind Nash-Kelvinator Merger And Some Possible Results

NEW YORK CITY—Paying high tribute to the ability of President George W. Mason of Nash-Kelvinator Corp. as a manufacturing executive, the April issue of "Fortune" magazine tells the story of the Nash-Kelvinator merger in an article which is subtitled: "The story of George Mason, Kelvinator's adroit manager, and why Charles W. Nash of Nash Motors sought him out."

Telling in considerable detail the story of Kelvinator's progress in the electric refrigeration and electrical appliance industries, the "Fortune" article also includes a discussion of some of the merchandising phases of the household electric refrigeration field.

"Last December," the piece in "Fortune" begins, "when stockholders of the Nash Motors Co. and the Kelvinator Corp. voted to merge their two organizations, financial folk scratched their heads wonderingly. Here was the biggest merger of industrially disparate units since the beginning of the depression and it didn't make any particular sense on the surface. . . .

"Why wed automobiles and refrigerators? You can't sell them through the same dealers except in isolated cases in small towns. The engineering problems of the two industries may be tangential, but they are hardly identical. The purchasing problems are superficially similar, but steel used in automobiles and steel used in refrigerator cabinets must be tempered differently—"

THE PERSONAL EQUATION

But, says "Fortune," such considerations omit the personal equation —the logic of the Nash-Kelvinator merger resided in special psychological circumstances.

"It resided primarily in the need of the seventy-three-year-old Charles W. Nash, maker of the Nash motor car ever since 1916, for a spiritual son to carry on the management of his chief interest. Mr. Nash had found that son in the practically unknown George Walter Mason, who made the Kelvinator Corp. great in its field without grabbing so much as an ounce of public glory for himself since."

In 1936, relates the article, Mr. Nash, who had a nice cash reserve but a stagnant sales situation, began combing the field for a manager who could not only make but sell his cars. Since he knows practically everybody of importance in the automobile business, a score of names must have flashed through his mind. But the only available candidate who gave promise of filling the bill was Kelvinator's Mr. Mason.

MADE NAME IN AUTO FIELD

"Mr. Mason's company was second only to General Motors' Frigidaire division in terms of the number of refrigeration units it makes and markets annually," declares "Fortune." "But Mr. Mason had grown up as an automobile man. From 1921 to 1926 he was Walter Chrysler's works manager; he had bossed the production of the sweet, humming roadster that made Chrysler history and reputation in 1924 and he was still known as 'one of Chrysler's boys.' Charlie Nash knew that George Mason still itched to make automobiles."

Nevertheless, Mr. Mason refused to be hired away from Kelvinator, where he had achieved real managerial success, and from which concern he was drawing a very good salary.

"Mr. Mason was satisfied with Kelvinator's past performance," the article continues. "And he was also satisfied with its program for diversification.

"But there was one very sobering thing about his balance sheet: his earnings and his surplus had not increased in proportion to his unit or net sales (gross sales minus returns) after 1933. Manufacturing costs were somewhat to blame for this, for they had gone up while distributor-dealer discounts and the retail selling price had remained more or less the same.

DIVERSIFICATION COST MONEY

"But the real financial burden came from the diversification that was eating up more and more of the gross. Mr. Mason naturally expects to get this money back with interest, but the profits in his new small-unit air conditioning, for example, may still be two or three years away, and other eager companies—Westinghouse, American Radiator, General Electric, Chrysler's Airtemp—are waiting to contest the field of providing air conditioning for dwellings as soon as it opens up. So far as air-conditioning research and development expenses go, the refrigerator profits may be paying for them for some time to come.

THE ADVERTISING BUDGET

"Another sobering thing about Mr. Mason's balance sheet was the cost of advertising, which, if not excessive when compared to advertising costs in some other businesses, is still a relatively fixed item of expense.

"Inasmuch as there is little choice in efficiency, economy, size, and design between Frigidaires, General Electrics, Norges, Crosleys, Westinghouse electrics, and Kelvinators, no one of the companies producing these refrigerators dares to do any conspicuous cheeseparing on its advertising budget; and when any one company increases its appropriations the others feel they must follow suit.

"For should the general public be allowed to take its eyes off any particular refrigerator, memory would not serve very long as a substitute for publicity; the housewife with money to spend would merely buy and rejoice in the possession of the next one that was called to her attention.

"Hence Mr. Mason's advertising and sales promotion appropriation—which has hovered around 10% of the gross income in recent years—has been sacred; none of it has been available for purposes of deflection to plant expansion. Last year he spent more than anyone else in the electric refrigerator business on advertising.

AN OPPORTUNITY SEIZED

"Charlie Nash's wooing, while it did not result in the hoped-for divorce of George Mason from Kelvinator, did have a desirable effect. For it set Mr. Mason and his directors to thinking about the Nash Co.'s moneybags and to wondering how they could tap that bulging cache for Kelvinator.

"They could, of course, have raised money for their company by a public stock issue, but here was an opportunity of getting more cash for less dollar obligation. All they had to do was to work out a merger with the Nash people. Mr. Mason readily fell in with the idea. Deep in his heart he wanted not only money for expansion but something extra to do beyond the needs of Kelvinator—and making Nash cars promised that something extra."

And so it came to pass, relates "Fortune," that the merger was consummated.

Declaring that Mr. Mason's "Falstaffian waistline is as deceptive as Charlie Nash's sentimental interludes," the article pictures Mr. Mason as follows:

"This man who looks as if he habitually enjoyed eight-course dinners lives largely on grapefruit and lettuce. He is anything but slumbrous. Quick with his hands and eye, he is one of the best dry-fly fishermen in the state of Michigan—a purist at the art who would hang anyone who used a baited hook.

"His friends call upon you to witness that his muscular coordination is perfect, and that his senses are so acute that he can take a quick jaunt through almost any industrial plant and come out with a pretty detailed notion of what's right and wrong with it.

A GOOD TRADER

"In a trade Mr. Mason invariably comes off well. One of his earliest boyhood business triumphs was starting with a penknife as swapping material and ending up with a motorcycle. His combination of girthy amiability and a keen sense of how far he can go and how much he can get makes him one of the best negotiators in the electric-appliance business.

"Anything that he does has the marveling approval of his associates. But they reserve their most wide-eyed wonder for his abilities as an automobile driver, for here he is both demon and expert. His trout-fishing camp, on the Au Sable River in northern Michigan, is 200 miles from the Kelvinator Detroit plant on Plymouth Road, and he covers much of this distance at 70 or 80 miles an hour.

"His ingrained Barney Oldfieldism is not just the damnfoolishness of thrill seeking. For Mr. Mason has always had a safe and compelling way with motors. He has owned 23 motorcycles in his 46 years and has raced them on half-mile flat tracks. At 16 he had a motorcycle distributorship in a Dakota town. Later he had an automobile distributorship with his father, and before he went to the University of Michigan engineering school he could take a car apart and put it together again with his own hands.

MASON'S EARLY HISTORY

"With this background in mind, it is easy to see how the young George Mason jumped ahead in manufacturing. After college he worked for Studebaker, where he made a great impression on William Robert Wilson, who was then assistant to the general manager. Friendship with Wilson was to take him a long way toward the top.

"When Wilson went to Dodge in 1914 he carried Mason with him and saw to it that he got some selling experience as well as factory-layout work. During the War Mason was invited by the U. S. Army Ordnance Department to coordinate the activities of the Rock Island Arsenal. His friend Wilson had meanwhile taken a job with the Irving National Bank as Vice President in Charge of Business Extension, and Mason followed him after 1918 into the Irving, where he stayed for a year and a half.

"When Walter Chrysler hired Wilson to oversee the reorganization of the Maxwell Motor Corp. in 1921, Mason was offered the job as works manager. He was then only 30 years old. But if there were any doubts about his ability to fill the bill, they were soon dispelled. For as the creaky Maxwell underwent its sea change into the purring Chrysler, Mason did a bang-up job in getting the units produced.

WAS HEAD OF COPELAND

"He stayed with Chrysler until 1926. Then Mr. Wilson, who had become Chairman of the Board of Copeland Products, Inc., one of the pioneer companies in electric refrigeration, beckoned to him for the last time. Mason took brisk charge of the company, and soon Copeland was seriously threatening the position of the great but floundering Kelvinator Corp. The Kelvinator Board of Directors, prodded by the impatient banks, decided in 1928 that they had to do something in a hurry. So they went to Mr. Chrysler for a good name—and Mr. Chrysler said: 'Get George Mason.'

"To keep the nature of Mr. Mason's subsequent accomplishment clear we must now look at the Kelvinator Corp. as it was in the dark days of 1927-28 and before. The company had been founded in 1914, with A. H. Goss, former Buick secretary, putting up the capital. Two engineers, E. J. Copeland—who later left to form Copeland Products, Inc. —and Nathaniel B. Wales, the latter an M. I. T. graduate, did the pioneer experimenting.

"The problem was not to pump cold into a box, but to extract heat from it. Applying the laws of heat transference refined by Lord Kelvin, the two began experimenting with ammonia, which had long been in use in big packing plants for cooling purposes but had not yet been adapted to the home. They put ammonia gas under a pressure high enough to liquefy it. Then they shunted the liquid ammonia by pipe into a box. When it hit the box the pressure was relaxed; this caused the ammonia to expand to a gas again and pick up heat. The process cooled the box. The heat-carrying gas was then passed on to a pump to be compressed all over again. The cycle was complete.

"Abstractly considered, there was nothing the matter with all this. But practically speaking, the ammonia proved a dud. The cumbersome machinery it required for compression was uneconomical when applied to small boxes. And the gas itself was suffocating—a menace in the case of a box with leaky coils or pump.

"Finally Copeland and Wales turned to sulphur dioxide (SO_2 or 'esotoo,' as it is spelled by refrigeration engineers). The esotoo was less dangerous and also did its work under lower pressure. Once the automatic control and leakage problems were licked, the Kelvinator, as Stanley Resor of the J. Walter Thompson advertising agency baptized the Goss-Copeland-Wales product, proved a merchantable substitute for the old-fashioned icebox.

"The first ones were sold in 1918. The Guardian Refrigerator Co., which became the Frigidaire Corp. after W. C. Durant bought it for General Motors, ran a practically dead heat with the Goss company in getting its box on the market, so it is difficult to know just who deserves the title of Columbus of successful household electric refrigeration.

NOISE WAS BIG PROBLEM

"The earliest boxes were noisy and inefficient—'damned threshing machines,' as some of the old-timers recall them. And they remained noisy throughout the twenties as the crude compressors racked and wrenched at their work. But during some of these years the boxes brought bonanza prices to Kelvinator. In 1926 the unit sales were 39,000—or 12% of the 1936 unit sales. The 1926 dollar sales of $17,160,000 for the nine-month selling period were, however, some 54% of the full year 1936 dollar sales.

"If Kelvinator had steered clear of unwise management and too much financing it might have cleaned up in the pre-Mason days. But Mr. Goss tripped over himself in his hurry to merge and expand. His moves were not intrinsically bad; they were simply badly timed.

"The 1925 merger with the forty-four-year-old Grand Rapids Refrigerator Co., which made the popular Leonard icebox ('clean as a china dish') and had been supplying Kelvinator with its cabinets was a logical one. For by merging with the Leonard company, Kelvinator got not only a complementary industry but also a great name. It has continued to exploit this name by putting a separate line of Leonard electric refrigerators on the market.

"The merger with Nizer Corp., which took place at the same time, was likewise logical. Nizer made ice-cream cabinets for drug and candy stores, and ice cream cabinets were operated on the same heat absorption principle that the Goss-Copeland-Wales triumvirate had applied to the kitchen refrigerator.

STRIFE AFTER NIZER

"Once the three companies had been merged under the temporary name of Electric Refrigeration Corp., however, the cat fights began. Nizer engineers held out for a compressor unit that was directly connected by shaft with the electric motor. The Kelvinator engineers thought direct connection 'clanked like hell'; in arguing for the belt-driven compressor that is in use today they pointed to the parody slogan: 'Noisy Nizer—every time you hear it it's costing you money.'

"Factionalism was rife in other departments of the new company; the advertising staff, for example, refused to okay the plans of the publicity staff, and vice versa. And Mr. Goss chose this moment to go ahead with his plans for the huge 700,000-square foot plant that is now only a part of the space that Kelvinator occupies on Plymouth Road. The plant went up; but the refrigerators it assembled had serious cabinet flaws and many of them bounced back.

"In one year, between 1927 and 1928, the total assets of the company dropped from $23,000,000 to $16,000,000. Current assets shrank from $11,000,000 to $5,000,000, cash from $3,500,000 to $230,000. Goss had already given way as President to C. K. Woodbridge, the bankers' frantic temporary choice, but Woodbridge, who had come from Dictaphone, was primarily a salesman and not a manufacturing man. The moment had arrived for Mr. Mason's soothing and invigorating therapy.

"'I did the obvious,' says Mr. Mason. The 'obvious' began with the plant. First he eliminated backtracking in the assembly line. Then he introduced better tooling and gauges and cut down the loss on scrap. But it was with the looks of the product that he was immediately concerned. An automobile man with a sense of

(*Concluded on Page 7, Column 1*)

Why This Article

Famed for its high subscription price ($10 a year), its luxuriant makeup, and its chronicling of the history of major industrial concerns is the monthly magazine *Fortune*.

The excerpts from the article "Nash-Kelvinator" in the April issue (published here with the permission of *Fortune*) are presented to readers of AIR CONDITIONING AND REFRIGERATION NEWS because the article outlines the history, methods, and problems not only of Kelvinator, but of the electric refrigeration industry as a whole. And it marks the first time that *Fortune* has deigned to deal editorially with the one major industry whose progress wasn't halted by the depression.

Much of the information is not new—some of the material should sound quite familiar to readers of REFRIGERATION NEWS—but all of it is interestingly presented in *Fortune's* vivid, lively style.

Also, the article marks the first time that the spotlight has been thrown on the personality and personal history of President George W. Mason of Nash-Kelvinator. Long-time readers of the NEWS will remember that five or six years ago Editor George Taubeneck did a series of biographical sketches of practically every major electric refrigeration industry executive with the exception of Mr. Mason who, as *Fortune* points out, has studiously avoided any kind of personal publicity.

MANHATTAN

V BELTS

Run smoothly . . . without noise . . . and last longer; repeated tests prove this.

The highly satisfactory service and life of these belts is due to the exclusive Manhattan construction: the endless Whipcord is completely floated in rubber, welded securely into a strong tension member which is placed in the neutral axis area. Above this an extensible section and below, a compression section. Result: internal heat reduced to a minimum.

THE MANHATTAN RUBBER MFG. DIV.
Of Raybestos-Manhattan, Inc.
45 Townsend St. Passaic, N. J.

EASILY SERVICED!

First, we built extraordinarily long life into this improved Sylphon Automatic Expansion Valve . . . did away with corrosion and pitting troubles with a new non-metallic valve poppet construction (see at right) . . . did away with rubber breather cups . . . made it moisture-proof. Then we made all wearing parts easily renewable, on the job. Provided a filter, ample in size, readily removed for cleaning when necessary. Isn't this the kind of trouble-free expansion valve you want?

FULTON SYLPHON COMPANY, Knoxville, Tennessee
Refrigeration Division

Sylphon

AUTOMATIC EXPANSION VALVE

Write for Bulletin O-5000

Nash-Kelvinator Seen As Pioneer of a New Kind of Corporation

(*Concluded from Page 6, Column 5*)

style, he took particular pains to do what he calls 'trading up the product' with his men.

"'Hell,' he would say, his teeth chewing at his cigar, 'this is out of balance.' Or, 'this handle's too long.' Or, 'this damned vegetable box is too narrow; it won't hold enough to feed a bird.' Or (in a final burst of irritation), 'take this cabinet away; it looks like an outhouse.'

CRITICISMS BROUGHT RESULTS

"By the time he was through with his brusque criticisms his designers were giving him really stylish models.

"With performance he was just as persnickety. It took a long time for a 1929 Kelvinator box to freeze ice cubes. One day Mr. Mason had a bright idea. Why, he asked of his engineers, couldn't they solder tubes containing the refrigerant to a plate under the ice-cube tray? That would freeze the cubes in short order.

"The engineers went back to work and produced the so-called isothermic tubes, which now produce solid ice cubes in a little more than an hour. Another Mason-Kelvinator device was the 'food-filing' system —separate metal drawers at the bottom of the refrigerator.

"With his men, particularly the men in his sales department, Mr. Mason used varied tactics. He cracked down on his advertising heads, for he didn't see the sense of letting them over-stimulate a demand for a product that the rickety dealer service of 1929 could not deliver to the impatient ultimate consumer.

"The next thing he did was to whip the dealer service into shape by weeding out and supplanting agents who were either lazy about covering the market or irresponsible about installment-sales risks.

"A little industrious schmoozing of the Leonard men, the Goss men, and the Nizer men ('What the hell, boys, we'll all go to town together') eliminated the factionalism. The big shots of the Goss and Woodbridge regimes remained big shots with him.

KELVINATOR'S KEY MEN

"Henry Burritt, the jolly, ruddy former President of Leonard who was sales manager of the merged Nizer, Leonard, and Kelvinator companies, continued to be sales manager for the new Kelvinator; today he is one of Mr. Mason's fishing and hunting cronies, and the fact that Kelvinator soon vaulted ahead of General Electric is evidence that he can sell refrigerators. Howard A. Lewis, the pleasant and cultivated cosmopolite who headed up the foreign-sales department, kept on with that job and also took over the office of treasurer.

"The sole important Mason importation to the company's brass-hat department was Harold G. Perkins, the bland, dark-eyed trouble shooter who acts as buffer and general assistant to the president.

ORGANIZATION CHART IDEA

"An organization chart of Kelvinator presents a picture of extreme decentralization, with men more or less free to act on their own initiative in fulfilling their given quotas. But Mr. Perkins, who belies his bland manner when he has a job to do that requires iron, holds each department rigorously within its budget; hence the decentralization is nicely calculated to release the ability without precipitating anarchy.

"In holding his men to top efficiency Mr. Mason has frequently worked by indirection. Instead of telling his sales department to keep better track of the way they were covering the country or else get the hell out, he merely asked his statistician for 'visual sales control' charts.

"When a county on one of these charts is painted gold it indicates that its cumulative sales are greater than its cumulative quota. When a county is painted red it signifies that sales there are under the quota. When a county has either no electricity or no towns of more than a thousand it is painted green.

"Mr. Mason didn't necessarily want these charts for himself. But he did want to make sure that Mr. Burritt and the rest of the sales department had a constant reminder from the walls that their job is keeping the dealers and distributors up to snuff.

The "Fortune" article, in discussing the merchandising problems of Kelvinator and other electric refrigerator manufacturers in recent years, tells how the problem of "fly-by-night" competition was met. It also touches on the future character and extent of the household electric refrigerator market. Some excerpts from the article dealing with these phases:

CHEAP COMPETITION DOWNED

"Electric refrigerator men like to speak of their business as a 'clean' business. A clean business is one that reveres stability in prices and markets. But the stability of 'cleanliness' was achieved in the refrigerator business only after much sorrow.

"In 1931 and 1932, when the big companies were making money only by cultivating mass demand and lowering prices, there was a rush on the part of new small companies to take advantage of the boom in refrigerators. Called 'fly-by-nights,' these small companies assembled the cheapest type of 'jollopy' boxes and insulated them with 'Michigan air.' Jollopies were sold directly to large retail outlets and hence called for no national advertising, no sales promotion. They were the first electric refrigerators to sell for less than $100. . .

"The distributor-dealer organizations of the old companies let out loud cries for help. When the big companies tried to prevent their products from falling into the hands of department stores, a period of "bootlegging" followed. Often a qualified distributor would sell refrigerators in good faith, say, to a buyer who said he wanted boxes to offer as prizes in a radio contest. The boxes thus marketed might eventually turn up in a New York department store, where they would be sold considerably below the list price.

"This cutthroat activity was eventually stopped when the big companies began to put their 'three-foot jobs'—i.e., refrigerators with approximately three cubic feet of storage space—on the market for around $100. . .

"They did this to kill the fly-by-nights, who could not afford to make good boxes to sell at the same price.

PRICE SITUATION IN HAND

"Today these price troubles are things of the past. The members of the refrigeration division of the National Electrical Manufacturers Association (Nema) comprising some 15 companies—Apex Electrical, Crosley Radio, Fairbanks-Morse, Frigidaire, General Electric, Gibson Electric Refrigerator Corp., Kelvinator, Leonard, Norge (a subsidiary of Borg-Warner), Stewart-Warner, Sunbeam Electric (which produces the Coldspot Refrigerator for Sears, Roebuck), Universal Cooler Corp., Westinghouse Electric, Johnson Motors, Merchant & Evans, and Sparks-Withington—now share about 93% of the market.

"Prices for comparable models run pretty uniform, no matter what company makes them.

"Now that the refrigerator price structure is more or less stable, the problem is: how to uncover the markets that will buy at the present prices. Annual quotas are established for the distributor-dealer organization, but before setting up any quotas Kelvinator undertakes a basic survey of the market by a well-known sampling method. Who needs a refrigerator? Who can use it? Who can pay for it? Are the ones who can pay for it in the big cities, or in the sparsely settled back-country districts? What is the cost of reaching the prospect? And what kind of refrigerators do people want?

"The styling, the models, and the quotas for each model, all depend on the answers to these questions. Engineering and production problems are thus subsidiary to the problem of first getting a good basic survey.

"The survey for 1937 indicated that 70% of this year's refrigerators will be bought by income groups making less than $1,800 per family. It also indicated that only 5% will be bought by people with incomes of more than $5,000.

"This means that the well-to-do market is pretty well saturated. Pessimists among the refrigerator men are inclined to think refrigerator sales are approaching a saturation point not only in the class market but generally.

"An estimated 40% of the 22,000,000 electrically wired homes of the U. S. already have 'electric iceboxes,' and experience has shown that when total sales of any electric household appliance hits the 50% mark that is about the limit of effective demand.

"But Kelvinator has calculated that replacement sales on electric refrigerators are only beginning—people who bought early models eight or 10 years ago are supposedly getting jealous of their neighbors whose kitchens glisten with the latest models.

"The life of an electric refrigerator is currently figured at 10 years. Figuring on an optimistic potential saturation of 80% of the market (16,000,000 refrigerators), replacement sales should eventually reach a minimum of 1,600,000 a year, which is 600,000 less than the refrigerator companies sold in 1936.

"There will always be continual new sales, of course. For young people will continue to get married, and new homes will be built and wired."

Pointing out that the most important item in the Kelvinator program —the Kelvin home—is Mr. Mason's pet idea, "Fortune" goes on to say:

"At a time when the rest of Detroit was turning its attention to the trailer, which proposes to put a nation on wheels, Mr. Mason thought he could induce people in the middle income brackets to pay for decent housing at home."

To market its products, says the magazine article, Kelvinator has two separate field organizations: the commercial, which is divided into eight districts, and the domestic, which is divided into five. Kelvinator's distributors number 114; they sell to 5,418 dealers. Leonard has 66 distributors and 4,232 dealers.

MACHINERY FOR THE MASSES?

Concerning Kelvinator's "diversification" program into air conditioning and the field of general appliances for the home, "Fortune" says:

"The move into these other products points to a kind of industrial concern which may possibly arise out of the seemingly illogical merging of an automobile builder with a refrigerator manufacturer. The products now made and the new lines being explored can all be classified in the phrase 'machinery for the masses.'

"No matter how widely the steel requirements of the design problems of an automobile or a refrigerator may differ from those of an electric range, they are all products that call for that highly specialized technique, mass production and assembly, an art of which Mr. Mason is a proved master.

"Such products also call for a certain type of distributing activity, commonly known as specialty selling, which is in itself another complex art. It may be, therefore, that Mr. Mason is aiming at cutting himself slices of many different mass-machinery markets.

"The logic that would bind such an enterprise together would be the 'know how' of mass production and specialty selling. This Mr. Mason has. The account of Mr. Mason's publicity, and especially of its residential centerpiece, the Kelvin Home, implies that there is some basis for this speculation."

This Is the End Bearing

Carrying the load of the crank shaft, it must stay in place for millions upon millions of revolutions. It must also prevent even an infinitesimal distortion of the seal. That's why it's line-reamed, oversized, and has positive bearing alignment. A perfect example of Mills Modernized Refrigeration.

Mills Condensing Units

Mills Novelty Company

4100 Fullerton Avenue, Chicago, Ill.

AROUND THE WORLD WITH GEORGE F. TAUBENECK

Articles in Editor George F. Taubeneck's "Around the World" series have appeared in the following issues of the NEWS:

Jan. 8, 1936—Detroit, Mich.; Jan. 15—Jackson, Mich., and Chicago, Ill.; Jan. 22—St. Louis, Mo.; Jan. 29—Claremore and Tulsa, Okla.

Feb. 5—Dallas, Tex.; Feb. 12—El Paso, Tex., and Juarez, Mexico; Feb. 19—Yuma, Globe, and Phoenix, Ariz.; Feb. 26—San Diego, Calif. (also California Pacific Exposition).

March 4—Los Angeles and Hollywood, Calif.; March 11 and 18—San Francisco, Calif.; March 25, April 1 and 8—Honolulu, Hawaii.

April 15—Pago Pago, Samoa, and Suva, Fiji Islands; April 22 and 29—Auckland, New Zealand.

May 6—Melbourne, Australia; May 13 and 20—Sydney, Australia; May 27—Brisbane and Townsville, Australia.

June 3—Shipboard (Sydney to Singapore), and Darwin, North Australia; June 10—Papua and New Guinea, and Soerabaya, Java; June 17—Bandoeng, Batavia, Semarang, Soerabaya, Solo, and Djocja, Java; June 24 and July 1—Singapore, Straits Settlements.

July 8—Penang, Straits Settlements, and Rangoon, Burma; July 15—Calcutta, India; July 22 and 29—Benares, Agra, Delhi, and Bombay, India.

Aug. 5—Suez Canal; Aden, Arabia; and Cairo, Egypt; Aug. 19 and 26—Tel-Aviv, Haifa, Jerusalem, and Jaffa, Palestine.

Sept. 9—Complete text of paper delivered at Seventh International Congress of Refrigeration, The Hague, Holland; Sept. 16 and 23—Colon and Barcelona, Spain, and Marseilles, France; Sept. 30—Malta.

Oct. 7, 14, 21, 28, and Nov. 4—Paris, France (including study of French quota system and survey of the French market).

Nov. 11, 18, and 25—Monte Carlo and Italy; Dec. 2—Rome; Dec. 9—Milan and Venice, Italy.

Dec. 16, 23, 30, Jan. 6, 13, and 20—Vienna, Austria, Lichtenstein, Budapest, and Hungary.

Jan. 27, Feb. 3, 10, 17, 24, and March 3—Switzerland and The Netherlands.

March 10, 17, and 24—Denmark and Sweden.

Incredible Tennis

I played tennis at 2 o'clock in the morning in Stockholm—in broad daylight.

In June and July the sun drops below the rugged Stockholm skyline around 11:30 p.m., and rises again shortly after 1:15 a.m. Meantime a twilight glow in the sky diffuses the darkness, and gives an Indian Summer cast to the atmosphere.

Reveling in this superabundance of sunshine, the Swedish people seem scarcely to sleep at all during the apex of their summer. They work, they play long hours, and they bask.

Winters, of course, are compensatorily black and bleak. Five hours of daylight is all they expect during the worst part of the cold months. So when summer comes, their bound spirits are unleashed, and they play with abandon and zest.

So did I. And so would you.

* * *

Honeymoon City

For a June honeymoon, what could be sweeter than a fortnight in Stockholm? First the wedding, then a grand boat trip (lasting a few days longer than the usual Atlantic crossing—which is all over just as you are beginning to enjoy it). Next a comfortable train trip (Swedish rail accommodations are excellent — even third class seats are upholstered) and finally Stockholm, a city of light and joy and beauty.

Venice, the storybook spot for honeymooners, owes its unique appeal to the fact that it is built on islands, that canals have supplanted streets in its layout, and that it is historically romantic.

Stockholm is built on islands, too; and is frequently dubbed, "the Venice of the North." Its great Viking tradition offers rummage possibilities to the historically inclined. And its food, hospitality, and gift shops are more than the equal of those which help make Venice so popular.

Best of all, Stockholm is *clean*. It smells nice. It is well scrubbed. And though it has an intriguing "old quarter," it presents a highly modern aspect over most of its area.

* * *

Grand Hotel

Grand Hotel is the place to stay. I was in and out of four different hotels before I followed the advice of Nils Laurin of Electrolux, and moved into Grand Hotel.

Prices are not low, but what an excellent feeling of well-being pervades one after just a few moments in its restful, well-ordered atmosphere. (Don't you think the management should give me a discount next time I check in, after this gratis paean?).

Example of the luxurious appointments: Attached to each lavatory bowl is a *shower bath for the hands*. It's real fun, too. What's more, they furnish soap. Most foreign hotels don't.

Nearby is a magnificent restaurant in a pleasant park. While a large orchestra plays in a circular bandstand, couples dance inside on the restaurant floor, and outside people sit on benches, rest, and listen to the music. It is all lighted up like a Christmas tree, and is a most pleasant place to spend a summer's eve.

* * *

Music Goes 'Round

Each time I went there the band played "The Music Goes 'Round and 'Round," a number which I was unable to escape all around the world (just as I found the Ginger Rogers-Fred Astaire picture, "Top Hat," playing in the leading cinema of almost every large city from Melbourne to Bombay to Vienna).

Students of American jazz, those who consider it an authentic art form, a genuine contribution to musical history, should take a trip around the world. They'll find jazz everywhere that couples dance; but what's more interesting, they'll find the different stages of development in jazz preserved for them.

American jazz has gone through a progressive evolution from the Original Dixieland Jazz Band and Louis Armstrong, to Red Nichols and Isham Jones, to Wayne King and Guy Lombardo, to Casa Loma and Hal Kemp, to Benny Goodman and the Dorsey Brothers—each band representing a further development of the idea.

Each of these stages featured a different instrumentation. First the cornet was the keystone of the band; then the trombone; then the saxophone; then the muted trumpet; then the clarinet; and today it's liable to be anything from an accordion to an electric guitar, or from an electric organ to a slide trumpet.

Well, in Singapore you'll find a band playing like the Original Dixieland combination. When jazz arrived in Singapore, it was in that stage; it hasn't changed since.

In Bombay the bands play like Red Nichols did several years back, with emphasis on unmuted trumpet and tenor banjo. In London and Paris the Wayne King 1932 style dominates. In Vienna the bands play like the Hal Kemp of 1935.

Your serious student of jazz (call it "swing," if you like) need not confine himself to recordings to study its history, if he can go abroad.

It's a funny thing how evolution—no matter in what line—is speeded up so in the United States. When something really new is tossed into a foreign country, they just let it lie.

* * *

Midsummer Day

My arrival in Stockholm was timed so that I could take in the national Midsummer Day festival—and so should you, when you go there.

From all parts of Sweden the countryfolk pour into Stockholm for this day of feasting, folk dancing, and music. They are so natural and so unaffected in their seeking for gaiety that a day in a crowd of them will renew your faith in the essential goodness of human nature.

Out at Skansen park I listened to a first-rate symphony orchestra, a fine choral society, three smaller orchestras—all in performances of Swedish composers, and all outdoors.

I saw the pretty, amusing folk dances—in costume, of course. And I spent 12 hours just wandering around among the politest, best-behaved, most agreeable mob of people (there were thousands) you could ever want to meet.

In Skansen and neighboring Tivoli park there are amusement "midways" similar to those at an American "fair." Most popular booth is the place where, for a fee, you can throw balls at chinaware! That was a new one on me, but it was an almost irresistible temptation to an atavistic urge which has survived since boyhood.

Few of the people, it seemed to me, indulged in smoking. Especially was this true of the women. They are great coffee drinkers—greatest in the world; and heavy liquor drinkers, as well as eaters. But during this national holiday, when everybody was out to play, I saw no drunks, no disorder; heard no loud talking, no arguments.

If you would understand a people, watch them at play. And if you would love a nation at play, go to Sweden.

They're mighty fine folks.

* * *

3,000 Islands

Within easy reach of Stockholm's taxiboats are some 3,000 islands. Almost everybody I met seemed to own one. In the summer Stockholm's business and professional men commute between their offices and their homes on these tiny islets. Nice life.

If you're going to Stockholm, try to find someone who knows someone who owns an island, so that you can wangle an overnight or week-end invitation. Then your visit will be complete.

Summer pastimes include games like tennis, of course (which the king has helped to popularize), but chiefly these come within the field of locomotion. Automobiles are plentiful, and American makes are popular. The Cord and Lincoln Zephyr were especially in evidence at the time of my visit, along with the Volvo, a Swedish make.

But if you don't have a car in Sweden, you walk. Whole families go on hikes; and it's the standard form of amusement for young couples on "dates."

Among the rewards of hiking and motoring are the excellent views. The countryside is rolling and colorful; meandering waterways are embellished with numerous arched bridges—plus the special silvery sheen which northern sunlight seems to impart to the streams.

Hence the views are peaceful and restful, lulling one into dreams or meditations. Switzerland and Austria for thrilling views—Sweden for the soothing variety.

* * *

Smorgasbord

Brief mention has been made before of Sweden's national sport—eating and drinking. As coffee drinkers they bow not even to the long-haired poets. Nine or twelve cups a day is but a nominal quota.

Liquor is consumed in quantities, and with an almost indiscriminate mixing of varieties. Swedish punch is standard with all meals, as is wine in France and Italy. They like wine, too, and champagne; and just to prevent boredom, quaff huge tankards of a heavy beer, and an explosive species of schnapps.

Meals are not especially multi-coursed, but each time the waiter brings in a plate, you have something Sturdy foods, not garnished or sauced, are the order. In this love of plain food, liberally portioned, the Swedes again resemble the English.

Neither the English, nor any other race on earth, however, can pretend to offer anything like *smorgasbord*, which is the most Swedish thing about Sweden.

Smorgasbord is an all-embracing name for appetizers. Chiefly these appetizers are cold seafood—many types of herring, lobster, shrimp, crabmeat, salmon, sardines, cod, and almost anything else which can be netted in the North Sea. These tidbits (understatement) are smoked, pickled, raw, and sometimes cooked.

Cheese, salads, eggs, and goodness knows what else also will be found on the creaking sideboards when you walk into a salon for *smorgasbord*. You don't load up your plate with the 57 varieties; rather, you take them one at a time over a period of what seems like hours to an American.

Although this practice is simply dictated by custom, it has its practical justification. It makes you get up and walk between loadings. And that's a help. Eventually, if you try to keep up with your hosts, you won't feel like getting up and walking again, ever.

* * *

Skoal!

You munch *smorgasbord*, and talk, and participate in innumerable skoals, and then go into dinner, and skoal some more.

"Skoal" is the Swedish national drinking toast—like "prosit," or "bottoms up," or "mud in your eye." It dates back to the Vikings, who drank their brew out of human skulls (whence came the word).

There's nothing for the visitor to do but stay and take it—until tea and cookies are served. When these sissy victuals arrive, everybody leaves.

You'd think that such an amazing stomach intake would make the average Swede a rolypoly fellow, but it doesn't. He is active all the year 'round—in the summer because the sun shines so much and is so inviting; in the winter because he has to keep moving to keep warm.

And then there are the Swedish masseurs, famous the world over. Undergoing massage treatments is another favorite indoor sport in this great land, and it's just what the doctor ordered for overindulgence.

* * *

In Hotels

In hotel dining rooms and large cafes or restaurants, the *smorgasbord* is heaped on a long table in the center or at the side of the room. Dishes number from 25 to 30. Guests serve themselves from the dishes.

Items I found on the Grand Hotel *smorgasbord* included three kinds of bread, butter molded into fancy shapes, fish (four varieties), cold meats, eggs, salads, cheeses, a number of casserole dishes, herring, mackerel, lobster, shrimp, caviar, and anchovies.

So great is the Swedish ballyhoo for krafta (crayfish), that the "season" is played up with a typically American publicity campaign, based on a patriotic eat-krafta motif.

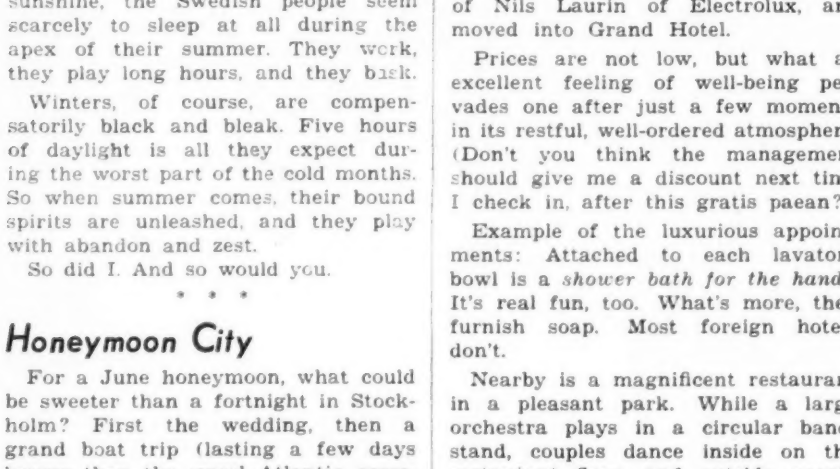
Hotels and restaurants have special dishes and platters decorated with krafta; linens and table-ware bear the krafta insignia, and restaurateurs deck their shops with lanterns and decorations fashioned in the form of this red lobster-like shell fish.

(Concluded on Page 10, Column 1)

Homely Scenes of Swedish Life

(1) Fishing in one of the main midtown canals. (2) Afternoon tea along the sidewalk is a Stockholm habit, just as it is elsewhere in continental Europe. (3) The Home Guard. In contrast to other European capitals, soldiers are rarely seen in Stockholm.

'Nothing Ever Happens'



In Vicki Baum's novel, play, and movie, "Grand Hotel," there was a famous punch-line: "Nothing ever happens here." Nothing "out-of-the-way" does happen in Stockholm's decorous Grand Hotel, pictured above. Its luxuries include shower baths for the hands.

Taxies Glide on Water

Its position on the map precludes its rising to importance as a port, but Stockholm harbors a vast fleet of boats, nevertheless. They act chiefly as passenger carriers.

-PROFITABLE SALES METHODS-

Taking the Convention to the Dealers

Instead of inviting dealers to come in for a convention, R. P. McDavid & Co., Inc., Kelvinator distributor in Birmingham, Ala., fitted up a special Pullman with appliances and took it through the territory. Shown here, during a radio broadcast from the car's observation platform, are, left to right: B. H. Cooper, Altorfer Bros. (ABC washers); Gene Rowen of the McDavid company; J. B. Johnson, Kelvinator district manager; the radio announcer; R. P. McDavid, president of the distributorship; Jimmy Jones, president of Birmingham City Commission; Jay Cook, treasurer of RCA-Victor Mfg. Co.; and Epp Speer and B. C. McCoy of McDavid company.

McDavid Takes Dealer Showing Around Alabama in Pullman & Gets Greatest Response in Company's History

BIRMINGHAM, Ala.—Discontented with the ordinary method of introducing its line of appliances to dealers, R. P. McDavid & Co., Inc., Alabama distributor for Kelvinator, tried an experiment this year. Instead of asking dealers to come to Birmingham to inspect the new lines, this company loaded samples of new merchandise, 12 officials, and six "offices" all on a special Pullman and, on Jan. 31, sent the Kelvinator Caravan out on a tour of Alabama.

Results of the experiment, according to Advertising and Sales Promotion Manager B. C. McCoy, Jr., were:

1. Thousands of Alabama's dealers, salesmen, and utility men were shown the new lines. Many new franchises were secured.

2. State-wide advertising for the 1937 merchandise was gained. "The whole state of Alabama is talking," declared Mr. McCoy.

3. The largest February business in the history of R. P. McDavid & Co., Inc., was done, and subsequent March business has surpassed it by 20%. Prospects for more than 1,000 Kelvinator refrigerators, ranges, and beverage coolers were closed during the trip.

SPECIAL CAR BUILT

By arrangement with the Pullman Co. a special coach was built with display rooms at each end and six rooms down the middle. These rooms served as offices during the day, and each one had the names of two officials on the door. Shower baths were installed, and the whole car was specially wired for 110-volt a.c.—current to operate the appliances and neon signs aboard.

Samples of every size Kelvinator refrigerator, according to Mr. McCoy, were anchored in place together with electric ranges, water heaters, and commercial equipment. There was a large blown-up picture of the new beverage cooler, the cooler itself not being available for the trip. ABC washers and ironers and RCA Victor radios also were displayed. All type of folders and other information necessary to handling of business with dealers were placed in the offices.

Ten cities, routed over the state in such a way that dealers would have a minimum distance to travel in order to view the 1937 merchandise, were included in the itinerary in the following order: Decatur, Sheffield, Huntsville, Anniston, Gadsden, Montgomery, Mobile, Andalusia, Troy, Dothan.

PUBLICITY IN PAPERS

"In advance of the train's leaving Birmingham on the swing over the state," declares Mr. McCoy, "all newspapers both daily and weekly in every town in the state were furnished with a story describing the train, its equipment, purpose, and personnel, and also mats of the train, and men aboard. In nearly 100% of the papers furnished this publicity a story appeared before the train arrived, and in most papers two stories were run. In some cases a third story appeared after the train left the city.

"Dealers were invited in by direct mail and by the use of an advance advertisement in the Southern Radio News, a weekly paper that reaches some 1,400 dealers in the territory.

"On the night of Jan. 31 the train left from the I & N station in Birmingham. Before leaving, a radio broadcast was made and Jimmie Jones, President of the City Commission, wished the crew best of luck and extended his congratulations on the idea. Treasurer Cook of RCA; J. B. Johnson, district manager for Kelvinator; and B. H. Cooper, district manager for ABC, also went "on the air."

Decatur, Ala., was the first stop. The train arrived there during the night preceding Feb. 1, was spotted on a leading street of the city where much traffic would have to pass the Caravan, and a.c. current connected. The next morning "dealers, salesmen, and utility men began to arrive in droves. All day long Decatur crowds came to see the new models and dealers to sign up for their 1937 orders."

One-day stops in each city seems to have been the rule until the Kelvinator Caravan arrived in Montgomery. States Mr. McCoy:

"The train moved into Montgomery early Saturday morning to be met by a large crowd. For two days the Caravan was crowded morning and night by those merchants in and near Montgomery, and on Sunday a radio broadcast was made in which the secretary of the chamber of commerce welcomed the Caravan to that city."

CROWDS IN MOBILE

Though the train arrived in Mobile in the midst of the Mardi Gras celebration, Mr. McCoy says capacity crowds visited the train. Local radio stations broadcasted a remote-control program originating aboard the Caravan, Mobile's Mayor Taylor, Sales Supervisor Earl Austin of the Alabama Power Co., Mr. Evans of Adam Glass, and others speaking.

In Andalusia, where the home office of the Alabama Water Service Co. is located, G. A. Johnson of that concern and his entire force were reported to have visited the train. The Caravan's personnel and the sales force of the service company ate luncheon together.

Those officials of the R. P. McDavid & Co., Inc., who manned the Kelvinator Caravan were: President R. P. McDavid, Secretary-treasurer J. R. McDavid, Northern Division Manager Epp Speer, Southern Division Manager Gene Rowen, Advertising and Sales Promotion Manager B. C. McCoy, Jr., Wholesale Representative Ira Underwood. Other caravaners were: Merchandise Manager J. S. Sutherland and Sales Manager J. A. Lester of the Alabama Power Co.; District Manager J. B. Johnson and Tom Craig, Range Division, Kelvinator Corp.; District Manager B. H. Cooper and E. R. McElroy of Altofer Bros.

Hotpoint Opens Nautical Range Sales Campaign

CHICAGO—Sailing orders signed by the sales manager as Skipper, ship's articles, manifests, and other sea terms will provide a nautical atmosphere for Hotpoint's Skipper Campaign, recently released range-selling project for utilities and dealers.

The plan, as prepared by Clinton Brown, sales campaign manager, will run through April, May, and June, and will comprise a complete selling program of newspaper advertising, sales contests, direct mail, posters, and other sales aids.

The Skipper Campaign is second in Hotpoint's year-around program for 1937.

Mericope Leases Larger Quarters in New Orleans

NEW ORLEANS—Mericope Appliances, Inc., local Hotpoint dealer, has signed a long-term lease for larger quarters at 728-30 Poydras St. here.

MILD FUMES?
"There ain't no sech animal!"

Not In Refrigeration
To work in any concentration of ammonia, sulphur dioxide or methyl chloride, a man needs a good mask.

CESCO
HEALTHGUARD FUME KIT

Was designed especially for refrigerator servicemen. In it is embodied everything that's needed in this work and nothing that isn't. Cartridges for the three major refrigerants — instantly interchangeable. The mask is put on or off with one motion and has a soft, comfortable facepiece that effects a perfect seal. All fit compactly in a light, handy carrying kit. Write for literature.

CHICAGO EYE SHIELD CO.
9352 Warren Blvd. CHICAGO, ILLINOIS

CONDENSERS
DOMESTIC EVAPORATORS
COMMERCIAL EVAPORATORS
AIR CONDITIONING SURFACE
McCORD
REFRIGERATION AND AIR CONDITIONING Products
BLAST HEATING SURFACE
COMFORT COOLERS
MARKET COOLERS
UNIT HEATERS
CATALOGUES ON REQUEST
McCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN

ANACONDA COPPER REFRIGERATOR TUBES

Coils are wrapped in moisture-resistant paper which protects the finish of the tubes.

Cutaway view of inside of tube. Note the bright inside surface.

Specially deoxidized . . . thoroughly dehydrated, unusually soft

There are three outstanding reasons why Anaconda Copper Refrigerator Tubes enable you to do a first-class installation job quickly, easily . . . and with the best results for your customers.

1—Deoxidized. Anaconda Copper Refrigerator Tubes are 99.9% pure copper, specially deoxidized to increase their corrosion-resistance.

2—Dehydrated. These high quality tubes are thoroughly dehydrated. They are manufactured according to A. S. T. M. specifications by methods which assure *unusually bright, clean inside surfaces.*

3—Soft. Then, too, Anaconda Copper Refrigerator Tubes are unusually soft. They may be easily bent and will *flare without cracking.*

The leading refrigerator manufacturers' specifications for tubes to be used in installation work are met by Anaconda Copper Refrigerator Tubes. When *you* install them, you give the purchaser full value for his money. The result is increased good-will for yourself and for your business.

Anaconda Copper Refrigerator Tubes are carried in stock by leading distributors of refrigerator parts.

ANACONDA
36418

FRENCH SMALL TUBE *Branch*
THE AMERICAN BRASS COMPANY • *General Offices:* WATERBURY, CONNECTICUT

Posies for Sale

Grimly surveying her remaining posies, this Swedish flower seller is typical of her tribe. Sweden rivals Holland in its enthusiasm for flowers.

Liquor Control

(*Concluded from Page 8, Column 5*)

Restaurants must be licensed before they may serve liquors to their patrons, and then they can serve them only in specified quantities during the course of a meal. The amount allotted at one sitting is 15 centilitres (about four ounces).

If you are adept at juggling your centilitres you can order so that the meal is bounded and intersected by liquids. Such a "schedule" would begin with a glass of Swedish brannvin or schnapps, continue with wine suitable to each course (or beer), a liqueur with coffee, and finish with a stiff highball. The prices aren't high, and the quality of the liquor is good.

Beer is sold in most of the cafes and restaurants. Although its alcoholic content and its price are fixed by governmental restriction, in most districts you can buy it in any quantities you wish.

Restrictions governing home consumption of liquors are enforced through stores controlled by the government. For household use, a man may purchase a maximum of 4 litres of liquor a month (a litre is not quite a quart in our scale of measurements). Wine and beer can be purchased in any quantities.

The distribution system by means of which the liquor control is exercised is effected through district offices located in alloted sales territories. Customers are investigated at the retail offices; their names are registered there. All purchases made by approved customers are also registered.

After one is investigated he is given a pass book in which his purchases are recorded. (If you are a guest in the country, your passport serves as a pass book at the retail liquor stores.)

* * *

King of Sweden

The King of Sweden is not a Swede. He is a Frenchman—not by citizenship, of course, but by race. The royal family name is Bernadotte; and the founder of the dynasty was a Napoleonic general, who was *elected* to his post when the Swedes were looking around for a good king.

Almost everybody agrees that King Gustaf is a fine fellow. Now that England's Edward is out-of-the-way, Gustaf probably has no rival claimant for the title of world's most democratic king.

He likes people, and rates them according to what they have accomplished, or how interesting they are, rather than according to the station in life into which they were born.

Society, as the Continent knows it, is a bore to Gustaf.

Undoubtedly he is most famous as a tennis player. Well over 70, he still plays a sound, sometimes brilliant, game. Each year he enters tournaments at home, and along the Riviera, where he is billed as "Mr. G." He frequently wins titles, too, especially in doubles play.

I met the Crown Prince—who looks like Noel Coward, 10 years hence, and who is something of a literary dilettante—but not the King.

* * *

Thirteen Islands

Situated at the mouth of Lake Malar, Stockholm is Sweden's capital city, and home of half a million of her population. It stretches over 13 islands—little islands and big ones—some linked together with strongly built bridges, others standing alone.

The city was founded in the middle of the 13th century by Birger Jarl, who fortified it to protect important Swedish provinces from the raids of the pirates who then infested the Baltic sea. Originally the city took in but three islands.

Copper roofs and beehive-shaped towers punctuate the skyline of the oldest parts of the city.

On the largest island of the original group stands the Royal Palace. Built in Italian Renaissance style, tnis massive, beautifully proportioned white palace is reflected in the waters of Lake Malar—a feature which makes even a palace seem twice as impressive.

The building was designed by Nikodemus Tessin in 1690. Its construction took 80 years.

Other buildings close to the palace which Swedish people point out as landmarks are the Riddarsholm Church, a sort of Swedish Westminister Abbey, where most of Sweden's kings are buried, and the House of Nobles (most notable example of 17th century architecture in Sweden).

* * *

City of Contrasts

Much of the charm which Stockholm holds for visitors lies in the contrasts apparent on every side. As you pick up fragments of Swedish history you learn that Stockholm is 700 years old, that the same race has inhabited the country for 10,000 years, and that the Swedish people have not waged, nor been drawn into, a war for the past hundred years.

Then you realize that Stockholm's contrasts are expressions of Sweden's progress and growth. Instead of the vertical strata which comprise archeological history, Stockholm presents a horizontal record. So well has she built in preceding centuries that ancient landmarks survive—and are still useful—alongside the structures of modern times.

In Stockholm's oldest sections narrow, cobblestone paved streets—seemingly top-heavy with old buildings packed closely together—branch off, tributary fashion, from wide, concrete thoroughfares that could hold up their heads alongside Chicago's Michigan Ave.

Medieval churches retain their staid old-world appearance on streets which also boast streamlined buildings of ultra-modern design. Contrast is further supplied by the recurring juxtaposition of land and water, motor boats and motor cars.

Every day is regatta day—or so you think when you see the hundreds of boats that fringe the shorelines of Stockholm's islands. Boats dock at the end of almost every street. There is an ever-present, ever-moving fleet, composed of little steamers, small skiffs, yachts, pleasure boats, lumber boats, and ocean liners.

* * *

Proud Town Hall

Claimed to be the most famous modern building in Europe, Stockholm's Town Hall is a landmark which is among the "must see's" in Sweden. Lavishness, exquisiteness of detail, beauty and richness—these are the qualities one attributes most easily to the Town Hall after he has examined the inside.

Externally, though, it reminded me of a Detroit warehouse. I said so to the party of Electrolux men who drove me there, and they nearly had me courtmartialed.

The building is situated close to the water (almost everything is in Stockholm) which gives it many natural landscaping advantages. Planned by Ragnar Ostberg, the building was 20 years in the process of construction, and during that time the artisans and workmen lived right on the spot.

Throughout the building the Swedish love for nicety of detail is evidenced in a hundred ways. Decorations in the rooms are the handwork of Sweden's artists; the statuary, wrought iron gates, black granite basreliefs, the drapes, carpeting—all are in themselves small masterpieces of Swedish skill.

Nominated as one of the most outstanding portions of the Town Hall is its Blue Hall—a room which achieves distinction through the skillful use of naked brick with handchiseled designs upon its surface, plus exquisite lighting arrangements.

The roof bears incontrovertible evidence of the sincerity of Swedish interest and pride in this building. During the World War, when copper prices soared sharply, and the architects thought it would be impossible to complete the roof according to the specifications (which called for all-copper construction), the required material was purchased with a fund raised by public contribution. Thousands of citizens paid six dollars each.

No wonder my friends resented any slur on its appearance!

* * *

Symmetry & Symbols

Streets of Stockholm show commendable symmetry. Buildings are of restricted height, and usually of uniform size. The shops, with their small square show windows, are so nearly alike that it would be difficult to distinguish them one from another were it not for their identifying signs. Doorways of many buildings are bedecked with coats-of-arms; and the shops bear symbolic signs. For instance—a pretzel indicates a bread shop; a cow denotes a dairy, etc.

Near the water's edge lies the market. Swedish producers foregather daily from miles around to display their products there. Shoppers arrive around nine o'clock in order to get the pick of the wares, and at that time bargaining is fast and exciting. Vegetables and fruits displayed there are of the same variety you see at markets in the United States; strawberries, gooseberries, cherries, potatoes, artichokes, carrots, peas, and beets—also fish, fowl, game, and meat cuts.

If you think that the police force of Venice is splendidly dressed, you should take a look at the Stockholm coppers. In their short military coats, brass buttons, pointed helmets, and gilt swords they make a picture of military splendor rivalled only by the guards at London's Buckingham Palace.

They are much in evidence in public places, and in the resorts, especially.

Saltsjobaden (meaning seabaths) located east of Stockholm, is the most fashionable watering place of Sweden's capital city. This resort is studded with splendid hotels, villas, and bathing pavilions; which, in turn, are studded with bejewelled vacationers, resorters, and travelers from all over the world.

Vaxholm, although not quite so stylish, is another well known resort. This little fishing town is visited mostly by excursionists.

* * *

Sports

The hundreds of bright sailboats, chugging motor boats, and other kinds of sea-going craft that dot the waters in and around Sweden supply the best answer to the question of what the Swedish race does with its leisure time.

Emphatically a race of sport lovers, it is but natural that the descendants of the Vikings should list boating as one of their chief sports. Races, regattas, cruises—these are all annual events in a water sports program that, from all evidences, seems to be national in scope.

Those who aren't sea-minded turn to golf, tennis, camping, hunting. Wintertime finds no let-down in the sports schedule; for ski-ing, skating, tobboganning, and kindred winter pastimes are popular all through Sweden's many provinces.

There are, of course, numerous summer resorts for those who make a ritual of vacationing. Two most popular (or really, most fashionable) Swedish resorts are those at Bastad and at Falsterbo. The country's finest tennis courts and golf links are the boasts of Bastad, while Falsterbo offers fine white sanded beaches as its special inducement.

* * *

In Brief

Sweden—the eastern part of the Scandinavian peninsula—covers an area of 173,146 square miles. It is separated from Norway by a broad mountain range.

Since Sweden reaches well up into the Arctic regions, one would expect the climate to be too severe for habitation of the white man; but this is not true, thanks to the warm waters of the Gulf Stream, and the consequent distribution of atmospheric pressure. The mean average winter temperature is not cold, and the summers are warm and agreeable.

Although religious faith is supposedly free, the Lutheran Protestant Church is recognized as the State religion. All Swedes are born into it.

Indications point to the fact that this country was peopled approximately 15,000 years ago, which makes Sweden the oldest inhabited portion of Europe.

Mother and Daughter

Ample beauties, the women of Sweden; and the fact that they don't go in much for cosmetics doesn't lessen their general attractiveness.

English Spoken

We were pleased to find that English was more generally spoken in Sweden than in any other country we had visited, with the possible exception of Holland. English is a compulsory subject in the Swedish schools.

Most people know that traffic laws in England require that you drive on the left side of the road, but did you know that Swedish traffic also goes to the left? I didn't either, but it didn't take me long to find out—about half a block.

Thus, with hearing their own own language, finding traffic directed similarly, and noting that the krona is tied to the pound, the English feel at home in Sweden. No fog, though.

* * *

Air of Prosperity

About Stockholm there is an air of confidence, of prosperity, of well being, that is most contagious. Buildings are not only substantial; they are immaculate and well groomed. Clothes are neat. Children behave.

Sky and water and architecture combine to give an impression of orderly beauty—beauty harnessed and put to work.

Pride of possession is especially well developed among the citizens of Stockholm, and Swedes generally. Especially do they take joy in owning examples of Swedish craftsmanship.

Artists in the fabrication of textiles, woodwork, bone and metal articles, are as well known—and applauded—in Sweden as are composers and painters in other lands. To own a Hald glass figure is an ambition cherished even by a common laborer. Silver or pewter articles by Fleming, molded steel figurines by Larsen—these are—Swedish treasures.

Outside of a collection of newspapers and magazines from every city on my itinerary, I brough back almost nothing in the way of souvenirs. In Stockholm, however, I broke down at last, unable to resist buying three woodcarvings, and some molded steel figures which are truly exciting.

These sculpturings in common materials have the long-limbed, full blown grace of the Swedish girls, the good taste shared by all members of the race, the lavishness of smorgasbord, the stimulation of quantities of coffee, and the daring of a people which has lived in lonely bleakness for a thousand years.

Crystalline and finished in character, they well represent a race which has had time and opportunity to complete and crystallize its institutions, mores, and thinking.

Folk Dancing Is a Tradition

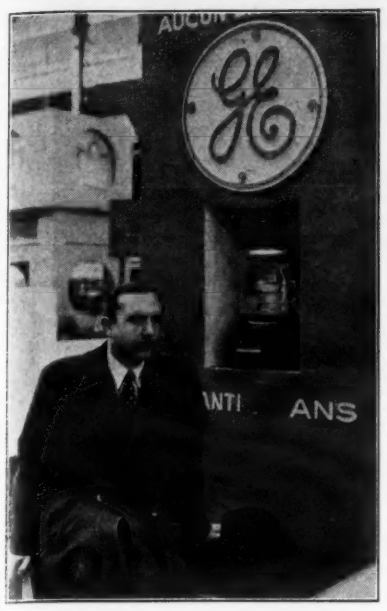
On festival occasions, such as the annual Midsummer Day, the people all over Sweden dress up in traditional costumes; and young and old enjoy the gaiety of the national folk dances.

—and His Fiddlers Three

Old King Cole had his Fiddlers Three, and so do Swedish folk dancers. These were snapped by the editor's camera at Skansen park, Stockholm, during the Midsummer Day festivities.

— FOREIGN TRADE NEWS —

Frigeco's Star



Charles H. Stirby, salesman in the Paris branch of Frigeco, S. A., (French G-E), shown with his company's exhibit at the recent Paris Home Appliance Fair, where Mr. Stirby boosted his record by 42 sales.

• • •

Parisian Stirby Credits Good Start Toward Becoming 'World's Best G-E Salesman' To 'Slow Approach' Tactics

PARIS, France—A strong belief in his product, use of what he calls "slow approach" selling tactics, and the ambition to become the "outstanding salesman of G-E refrigerators in the world," are factors behind the record of 503 sales in five years, established by Charles H. Stirby, salesman in the Paris branch office of Frigeco, S. A., French branch of International General Electric Co.

Mr. Stirby joined the Frigeco household sales division in November, 1931. Before that time he had had no selling experience. He sold 59 boxes during his first year with the firm, 72 during 1933, 86 in 1934, 116 in 1935, and 151 in 1936.

Nineteen commercial installations added to his 484 domestic refrigerator sales during the five-year period, raised salesman Stirby's total unit sales to 503.

Winding up 1936 with 151 sales, Mr. Stirby has lost no time getting into his stride for 1937, for his sales up to Feb. 15 totaled 51. Of these, 42 were sales made during the two weeks of the 1937 Salon des Arts Menagers—the annual Paris Home Appliance Fair.

An analysis of Mr. Stirby's 1936 sales show that 58% were 7-cu. ft. models, 40% 4 and 5-cu. ft. boxes, and the remaining 2% G-E Flatops. Average dollar volume per sale, scaled according to the prices prevailing in France, is approximately $325, and 87% of his total sales are on a cash basis, the salesman's records show.

Salesman Stirby is strongly against "high pressure" selling. His methods are, in fact, in direct opposition to this technique, since his plan is to establish a friendly bond with his customer before he does any actual selling.

Before he makes a contact call, he finds out as much about the customer as he can. He likes to go equipped with a knowledge of the customer's hobbies and chief interests, and since about 25% of his new sales leads are obtained from old customers, he can frequently do this.

Whether or not he has this advance information, Salesman Stirby uses a three-call plan in making a sale. At his first call he merely introduces himself and tells about the company which he represents. Refrigeration is introduced casually, and only in connection with its adaptability to the prospect's interests.

His second call follows the same pattern—except that he stresses refrigeration a little more. Then, with the customer in an interested and friendly mood, Salesman Stirby fires his sales ammunition full blast—and gets the sale. In presenting his sales story, this salesman never brings in the economy argument, he states.

Mr. Stirby has traveled widely, and speaks five languages. His biggest ambition—next to that of wanting to become the world's outstanding General Electric salesman—is to come to America and see the General Electric manufacturing plants, he states.

Porto Rican Utility's Sales Campaigns Go over Top

SAN JUAN, Porto Rico—Salesmen for Porto Rico Railway Light & Power Co. sold 367 Westinghouse electric ranges during two campaigns held here last fall, reports D. Y. Bowman, Westinghouse representative here.

In the first drive, held from Aug. 1 to Sept. 15, sales of the organization were 202% of quota; in the second, from Oct. 15 to Nov. 15, sales exceeded quota by 167%.

W. L. Zwigard, commercial manager, and F. Paonessa, merchandising supervisor, were in charge of the campaigns. Best sales records were established by Salesmen C. M. Cadiz, F. Aquino, J. M. Prado, and R. Ginoria.

Carrier Installs 400-Ton System in Shanghai Bank

SHANGHAI, China—Installation of a 400-ton Carrier air-conditioning system in the Bank of China here has recently been completed by Carrier-Brunswick International Division.

Anderson, Meyer & Co., Ltd., Shanghai's Carrier distributor, received the order from T. W. Soong, president of the bank, and Minister of Finance in Chiang Kai-Shek's government. The work was supervised by J. M. Rachal, Carrier engineer, formerly of East Orange, N. J.

U. S. Leads World in Home Use of Electric Current

CHICAGO—United States, with electric refrigerators in operation in 18.71% of its homes, radios in 82.42%, ranges in 3.38%, and water heaters in 0.97%, far surpasses other countries in its use of electric current service, according to a recent survey covering these appliances.

In Germany, the survey shows, 0.34% of the homes have electric refrigerators, 36.31% have radios, 0.34% electric ranges, and 0.80% electric water heaters.

Installations of electrical appliances in France the survey rates in this manner: electric refrigerators in 0.19% of the homes, ranges 0.19%, radios 13.51%, and water heaters 0.29%.

Electric radio sets are installed in 14.64% of the homes in Japan, the survey shows.

Hlawati Opens Remodeled Store in Oil City, Pa.

OIL CITY, Pa.—E. G. Hlawati has opened an appliance shop in a completely remodeled store building at 141 Main St. here. Mr. Hlawati's stock includes Sparton refrigerators and radios, Oakland ranges, Haag washers, and Cadillac sweepers.

British Super-Cold Makes Commercial Installations

LONDON, England—Glen O'Dee, Scotch Highland hotel on the River Dee, is one of the many British firms which have recently purchased refrigeration equipment from British Super-Cold, Ltd., here.

The hotel installed a 60-R with ice maker and water cooler in its kitchen, and a cooler and dispensing cabinet in the pantry.

Two British butchers, W. A. Dawson, Wealdstone, Middlesex, and Thomas H. Wooton, London, have refrigerated their meat boxes with Super-Cold equipment. John Clark, Stanmore, installed a 15 stone refrigerated fish cabinet.

Devonia Ice Cream Co., London, purchased a freezer, hardener, and dispenser for its new shop in East London.

Refrigerators Rank Well in Indo-China Import List

SAIGON, French Indo-China—Electric household refrigerators formed an important item of importation from the United States during the first five months of 1936, according to U. S. Consul Quincy F. Roberts, 74 cases of refrigerators being imported during that period.

Radio equipment also finished high on the list, as did dry batteries and automobiles.

Bushnell Sales Co. to Distribute Jewett in San Francisco

SAN FRANCISCO—Bushnell Sales Co. has been appointed distributor of Jewett refrigerators in this territory.

Four Refrigerated Storage Rooms Keep Perishables Fresh in Madras Food Store

MADRAS, India—Perishable foods brought in refrigerated ships from all parts of the world, and taken across country in refrigerated trucks and trains, are feature-items at the Spencer & Co. store here. The foods are preserved in a Kelvinator-equipped cold storage plant, said to be one of the most complete cooling plants in the tropics.

Refrigerated by three water-cooled condensing units, the cold storage plant consists of four chambers which open off a central passageway, in which a temperature of 70° F. is maintained.

Special temperatures are maintained in each of the four chambers where different type foods are preserved. One chamber, used for storing cured bacon and meats, is kept at a constant temperature of 30° F.; that used for storing frozen meats has a temperature of 18° F.

Frozen fish, imported from all parts of the world, is kept in the third chamber where the temperature is 8° F. The fourth chamber, cooled to 40° F. is used for the storage of butter, cheese, and other dairy products.

In the passageway, which is 6½ ft. wide, and 50 ft. long, chocolates are stored in wall cabinets.

To keep the foods cold as long as possible before they leave the store, customers are served from two display cases, placed close to the entrance of the passage way which connects the four freezing chambers. Frozen foods are displayed on a service counter kept at a temperature of 15° F.

Unusual feature of this installation is the manner in which water, which is at a premium here, is conserved. This was accomplished by installing a special cooling water recooling plant consisting of an underground tank, connected to the municipal main by means of a float valve, operation of which keeps the underground tank filled.

The system has two cooling water circulating pumps, one of which is held in reserve. The cooling water pump sucks the water from the underground tank and forces it through the condensing units. Hot water runs back into a mechanical water recooler, from which the cold water returns to the underground tank.

By this method, the cooling water requirements for the system have been reduced to approximately 200 Imperial gallons per week, while actually 1,000 Imperial gallons are circulated each hour.

Thompson to Handle Frigidaire Advertising in Argentina

BUENOS AIRES, Argentina — The Buenos Aires office of J. Walter Thompson Co. has been appointed to handle all advertising for Frigidaire Division, General Motors Sales Corp., in Argentina.

THE BETTER MOUSETRAP . . . . THE BEATEN TRACK!

Jobbers with Local Stocks

Albany, N. Y. — Hoy & Co.
Allentown, Pa. — General Refrigeration Supply Co.
Atlanta, Ga. — J. M. Tull Metal & Supply Co., Inc.
Baltimore, Md. — Clendenin Bros., Inc.
Baltimore, Md. — Melchior, Armstrong, Dessau Co.
Binghamton, N. Y. — Service Supply Co.
Boston, Mass. — A. E. Borden Co.
Bridgeport, Conn. — Parsons Bros.
Brooklyn, N.Y., Coleman Electrical Supply Co., Inc.
Brooklyn, N.Y. — Melchior, Armstrong, Dessau Co.
Buffalo, N. Y. — Root, Neal & Co.
Cambridge, Mass., Melchior, Armstrong, Dessau Co.
Charlotte, N. C. — Henry V. Dick Co.
Chicago, Ill. — H. W. Blythe Co.
Chicago, Ill. — Max A. R. Matthews
Chicago, Ill. — Borg-Warner Service Parts Co.
Chicago, Ill. — Refrigeration Equip. & Supply Co.
Chicago, Ill. — Fred C. Kramer Co.
Chicago, Ill. — H. Channon Co.
Chicago, Ill., Automatic Heating & Cooling Supply Co.
Cincinnati, Ohio — The Merkel Bros. Co.
Cincinnati, Ohio — Williams & Co., Inc.
Cleveland, Ohio — Williams & Co., Inc.
Columbus, Ohio — The Justus & Parker Co.
Dallas, Texas — The Electromotive Co.
Davenport, Iowa — Republic Electric Co.
Dayton, Ohio — The W. H. Kiefaber Co.
Denver, Colo. — Auto Equipment Co.
Detroit, Mich. — J. M. Oberc, Inc.
Detroit, Mich. — Borg Warner Service Parts Co.
El Paso, Texas — Zork Hardware Co.
Fargo, N. D. — Fargo Foundry Co.
Flint, Mich. — Shand Radio Specialties
Fort Wayne, Ind. — H. J. Schroeder Co.
Ft. Worth, Tex., McKinley Refrigeration Supply Co.
Greensboro, N. C. — Home Appliance Service Co.
Harrisburg, Pa. — Melchior, Armstrong, Dessau Co.
Hartford, Conn. — Melchior, Armstrong, Dessau Co.
Hempstead, Long Island, N.Y. — Sid Harvey, Inc.
Honolulu, T. H. — Theo. H. Davies & Co., Ltd.
Houston, Texas — D. C. Lingo Co.
Houston, Texas — Walter Refrigeration Supply Co.
Indianapolis, Ind. — F. H. Langsenkamp Co.
Jackson, Miss. — Enochs Sales Co.
Jacksonville, Fla. — Jamita Company
Kansas City, Mo., Forslund Pump & Machinery Co.
La Crosse, Wis. — W. A. Roosevelt Co.
London, Ont., Canada — Refrigeration Supplies Co., Ltd.
Long Beach, Calif. — L. B. Marsh
Los Angeles, Calif. — Refrigeration Service, Inc.
Macon, Ga. — Lowe Electric Co.
Memphis, Tenn. — United Refrigerator Supply Co.
Miami, Fla. — Railey-Milam, Inc.
Milwaukee, Wis. — Chase Brass & Copper Co., Inc.
Milwaukee Wis. — Refrigeration Specialty Co.
Minneapolis, Minn. — Chase Brass & Copper Co., Inc.
Minneapolis, Minn. — Refrigeration & Industrial Supply Co., Inc.
Montreal, Quebec, Canada — Railway & Engineering Specialties, Ltd.
Newark, N. J. — T. W. Binder Co.
New Orleans, La. — Enochs Sales Co.
New Orleans, La. — The Spangler Co.
New York, N. Y. — Aetna Supply Co.
New York, N. Y. — Melchior, Armstrong, Dessau Co., Inc.
New York, N. Y. — Paramount Electrical Supply Co.
Norfolk, Va. — Noland Co., Inc.
Oakland, Calif. — Pacific Tool & Supply Co.
Oklahoma City, Okla. — Mideke Supply Co.
Omaha, Nebraska — United Supply Co.
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Providence, R. I. — Rhode Island Supply & Eng. Co.
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Rochester, N. Y. — Melchior, Armstrong, Dessau Co., Inc.
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St. Louis, Mo. — The Spangler Co.
Salt Lake City, Utah — Peerless Utah Co.
San Antonio, Tex. — Straus-Frank Co.
San Francisco, Calif. — California Refrigerator Co.
Sacramento, Calif. — J. N. Blair Co.
San Juan, Puerto Rico — Refrigeration Supply Co.
Seattle, Wash. — Refrigerative Supply, Inc.
Sioux City, Iowa — National Refrigeration Service
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Springfield, Mass. — C. P. Payson Co.
Syracuse, N. Y. — Syracuse Equipment Corporation
Toledo, Ohio — The Heat & Power Engineering Co.
Toronto, Ont., Canada — Railway & Engineering Specialties, Ltd.
Tulsa, Okla. — Machine Tool & Supply Co.
Vancouver, B. C., Canada — Fleck Bros., Ltd.
Washington, D. C. — Refrigeration Supply Co.
Waterloo, Iowa — Winterbottom Supply Co.
White Plains, N. Y. — County Seat Plumbing Supply Co., Inc.
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Winnipeg, Manitoba, Canada — Railway & Engineering Specialties, Ltd.
Worcester, Mass. — Standard Supply Co.

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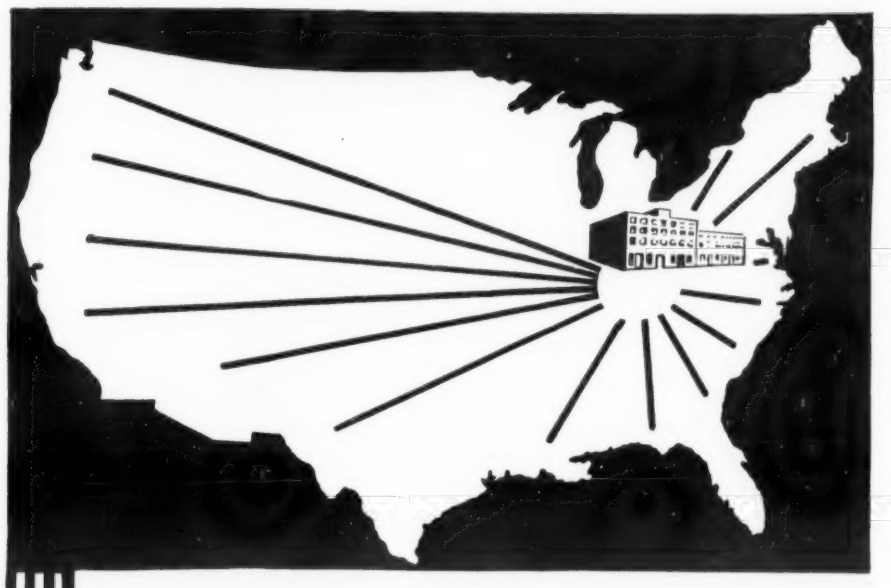

"If a man can write a better book, preach a better sermon or make a better mousetrap than his neighbor, though he builds his house in the woods, the world will make a beaten path to his door."—Emerson.

So it has been with Kerotest, the pioneer manufacturer of quality refrigeration valves and fittings who in 1924 began making valves better than they were ever made before. Today, the original beaten path through the woods has become a network of steel, water and concrete highways radiating to all parts of the refrigeration world.

A complete line of genuine Kerotest Valves, Fittings and Accessories is now readily available through approximately 100 Jobbers and Factory Representatives listed herewith for your convenience—a service as near as your telephone—ready to supply your every need with telegraphic promptness.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

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REFRIGERATION PARTS • "ALWAYS BETTER"
THE WEATHERHEAD COMPANY • CLEVELAND, OHIO

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'Grab It While You Can'

DID the "sit-down strikes" in Detroit really develop into the proportions of a revolution?

In case you have been confused by conflicting reports regarding a situation which has engaged the attention of the entire country, we offer readers this candid appraisal:

No matter what anyone may tell you, Detroit has been a frightened city. Civic leaders and local editors are rushing into print to declare that the cries of "Revolution!" were all a fake, now that the pressure has been relieved.

But the fact of the matter is that for more than a fortnight most Detroit citizens were far more jittery than they were during March, 1933, when every bank in the city was closed, when cash was practically unobtainable for necessities, and when the city was at the lowest economic ebb of any point in the country.

Detroit in Vanguard of Recovery

Fact of the matter is that Detroit then showed remarkable fortitude and good cheer. The city lived on crumbs, but its chin was up; and before long Detroit was leading the nation back to industrial and retail prosperity, and reemployment.

Quite different, however, is the current situation. The city has felt as helpless as if it had been occupied by a foreign power; and to tell the truth, the simile is not without its factual justification. In this case "the foreign power" which seized the city had its headquarters in the White House.

It was not only a case of property being kidnapped and held for ransom. It was not simply a flouting of the courts and the authority of local government. It was, in effect, a complete defiance of law and order.

Sit-down strikers are far from peaceful. They are militant, aggressive, blustering, belligerent, menacing. They have held non-union men prisoners inside closed plants. They have erected barricades to repel the "Cossacks." They have blocked off traffic around closed plants, refused to allow policemen to patrol their beats, and in general have taken charge of entire areas of the city.

Tacit Assent

Worst feature of the situation was the fact that it apparently had the approval of the present government of the United States. President Roosevelt remained mute—or gave tacit assent—while his largest campaign contributor, John L. Lewis, ordered the seizure of property all over the city, and while the man he had put in the governor's office, Frank Murphy, refused to enforce court orders to evacuate occupied plants and offices.

The big idea, it seemed, was to go as far as possible toward the complete unionization of Detroit—long a stronghold of the open shop—before alarmed public opinion was strained to the breaking point. "Grab it while you can" was the CIO policy. Sit-downs were called in hotels, retail stores, small factories of every variety, and among such diverse services as cleaning, trucking, and taxicabs.

Familiar Faces

In covering the situation Detroit newspaper men soon began to discover familiar old faces among strike organizers — the none-too-pretty countenances of members of Detroit's old Purple Gang, which supplied most of the killers employed by Al Capone, "Legs" Diamond, and "Dutch" Schultz during the heyday of racketeering.

Armed with brass knucks and blackjacks, these hoodlums would come into a spot ordered closed by the strike organizers, and take possession. The writer can personally testify to the presence of the cauliflower-eared hoodlums, the brass knuckles, and the blackjacks in the short-lived strike in Webster Hall, to which he was an eyewitness.

It should be noted that strikes organized by ex-gangsters did not come under the CIO aegis. Rather, the gangsters were simply taking advantage of the general hysteria and mob spirit to "cut themselves in" on the deal.

Strikers in Minority

Actual strikers in almost every case were in a minority. All too frequently the workers who "sat down," especially in smaller establishments, were fewer in numbers than the pug-uglies who came in from outside to establish a reign of terrorism.

Discovery of the gangster element proved to be the turning point in the situation. Aroused public opinion forced the police to move in on the small shops and retail stores which had been occupied by the gangsters, and wholesale ejections followed.

Wires to Washington sizzled with protests; and eventually the order came down from On High that the great Chrysler plants must be evacuated.

Non-Union Men Held Prisoners

Stories of threats and intimidation toward non-union men in Detroit are as many as they are deplorable. Held against their will in barricaded plants, some men caught pneumonia from sleeping on concrete floors; a few died. Wives of imprisoned non-union men reported threatening visits to their homes.

Richard Frankensteen, United Automobile Workers of America organizer and chieftain, went on record as saying that when the Chrysler plants were reopened, the union would make it so uncomfortable for non-union workers that they would be unable to stay on their jobs.

Today the situation is less tense, but is far from being under control. Chief worry of Detroit citizens who long for the complete restoration of law and order is that the elements which brought about the situation—or, to become personal, the attitude of Governor Murphy, President Roosevelt, and John Lewis—have not retracted from their stand that the *end* of unionization justifies any sort of unlawful *means*.

Who Is Governor Murphy?

Governor Murphy has attained his position much in the same manner as has President Roosevelt—by appealing to the discontented. He was swept into the mayorship of Detroit by organizing the vote of the unemployed. He turned his new political organization—built on the judicious use of relief funds—over to Farley, and went to the Phillipines as High Commissioner for his reward ($18,000 a year). Last year he was recalled from Manila to resume leadership of Michigan's have-nots and Detroit's malcontents, and to go into the governor's chair at Lansing. His moves are obviously dictated from Washington.

In the Detroit crisis President Roosevelt has proceeded on the same bull-it-through theory which has been the basis for all his previous actions: the theory that an emergency exists, and that the laws must be suspended until he gets the emergency under control. An "emergency" is defined in his lexicon, it would seem, as any condition he wants to change.

Good Intentions Are No Excuse

Most people seem to grant that the President's intentions are good. They so voted in the November election. But, as the Bible puts it, "the road to hell is paved with good intentions." Hitler and Mussolini undoubtedly have good intentions. But this writer, who not long ago spent some time in both Italy and Germany, would feel himself much abused if he had to live under the regimes of either of those well-meaning persons. So would you.

The point is that greed for power is like greed for money—the more you get, the more you want. And the more a dictator gets, the more he is convinced that his every wish, his every whim, is divine revelation.

Breakdown of Law and Order

Citizens of Detroit have had opportunity to see at close range the bad results of good intentions. They have seen how the Rule of Force operates. They don't like it, and want no more of it. But they are afraid—afraid that the disrespect for constituted authority engendered by the President's attitude may lead to further violence and interference with the constitutional rights of the people.

Look at the vicious circle: the President, the man who has the confidence of the electorate, declares that the courts cannot be respected. He is waging a mighty campaign to get them under his personal control. The governor of the state tells sheriffs to forget about orders of Michigan courts. What, then, is to prevent the lawless from doing what they wish? How can law and order be preserved when those who have sworn to defend it ignore flagrant violations? Where is it all to end?

At one and the same time the President and his henchmen appear to be encouraging lawlessness and preventing law enforcement. A situation of that sort calls for concerted action on the part of all citizens. It is to be hoped that the tide of public sentiment which is rising so rapidly in Detroit against this intolerable position will rise also in the rest of the nation, and eventually engulf the movement toward lawlessness before it gets entirely out-of-hand.

— LETTERS —

Deplores Nema Policy On Specifications

Moore Electric Supply
Wholesale Division of
Moore Machinery Co.
550 Fifth St., San Francisco
March 27, 1937.

Sirs:

Will you please send to us 10 additional copies of the supplement contained in your issue of March 17, Vol. 20, No. 11, Serial No. 417, covering specifications of various household refrigerators.

We certainly regret that the Nema organization decided against the issuance of more complete data than that contained in your supplement, but for this we cannot blame you. The information that you gave us last year was used most extensively and REFRIGERATION NEWS was given credit for the information that we disseminated. R. C. CHRISTIANSEN.

In a Hurry

Western Union Telegram
March 27, 1937.

Ship immediately 50 copies of part two only of March 17 issue of REFRIGERATION NEWS. Advise by air mail when we should receive these. Ship these express so as to expedite delivery. Is sure a fine issue.
REFRIGERATION SERVICE, INC.

Appreciates Specifications In Compact Form

The Harry Alter Co.
1728 S. Michigan Ave., Chicago
Grunow Refrigerators & Radios
Mar. 23, 1937

Gentlemen:

Again you have given the industry valuable information in a new handy package. It was a pleasant surprise to find the specifications for 1937 Refrigerators in a separate booklet which should prove a most welcome reference for the trade. Is it possible to obtain 12 additional copies for our use? Of course, you can bill us for them. MAX GEISLER

Red Book Nearly Ready

Haverly Electric Co., Inc.
East Syracuse, N. Y.

Editor:

We are wondering when you plan to send the copy of the "Red Book" for which we made application some time ago. A. H. KASTEN,
Sales Promotion Manager.

Answer: The first edition of the 1937 Master Catalog (the Red Book) is now in the final stages of production and the first copies will be ready for distribution very soon.

Data on 'Orphan' Makes In Specifications Book

Rock Hardware & Electric
Avoca, Iowa

Editor:

Sometime ago you had a page in your publication devoted to names of different refrigeration companies, and also names of "orphan" makes.

Would you please send us several copies of this page? I believe it was a December issue. Also send specifications sheet on household refrigerators.

ROCK HARDWARE & ELECTRIC.

Answer: Several years ago a list of manufacturers of "orphan" makes of refrigerators was published in REFRIGERATION NEWS, but this list is now out of date and the issue is out of stock.

Company history on all known manufacturing concerns which once produced household electric refrigerators, but which are no longer active in the household refrigeration field, is part of the information included in the REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS BOOK, which sells for $3. This will provide you with up-to-date information on "orphan" makes.

Specifications of 1937 models of household electric refrigerators were published in the March 17, 1937, issue of AIR CONDITIONING AND REFRIGERATION NEWS.

New Kerosene Unit

Markt & Hammacher Co.
Manufacturers' Export & Import Agents
193 West St., New York City

Editor:

We understand that a new kerosene operated refrigerator was recently put on the market by a manufacturer whose names we no longer recall. It is not Perfection, Gibson, or Electrolux, with whose machines we are already familiar. Could you possibly give us the name of this other manufacturer, or if there are others besides the three we have mentioned, we would appreciate having their names also. MANAGER.

Answer: We believe you may have reference to the Allyne kerosene-operated refrigerator, manufactured by Allyne Refrigeration Corp., East 193rd St. and Euclid Ave., Cleveland.

Attention: Manufacturers Of Display Cases

Kingberry Engineering Corp.
Air Conditioning, Refrigeration, Automatic Heating
291 Smith St., Perth Amboy, N. J.

Editor:

Is there any way in which you can help me out in locating the manufacturer of a dairy delicatessen display case? I saw such a case in a chain store, but there was no dates or markings on it, and in writing to the chain store company, they could not give me any information.

The particular feature that we are interested in is that there is a sliding butter tube shelf on each side of the 8-foot case, and in the bottom is also a sliding lard tube shelf for taking out and cutting from small purchases.
PAUL D. KINGBERRY, President.

Consul Found Directory Very Useful

American Consulate General
Antwerp, Belgium
Mar. 2, 1937

Sirs:

Receipt is acknowledged of your letter of Feb. 18, 1937, enclosing a few copies of a booklet giving brief information regarding various manuals on refrigeration and air conditioning which you request this office to transmit to individuals or firms in this district who are most likely to be interested in receiving such information.

In reply you are informed that the three booklets enclosed with your letter have been forwarded to the following firms which have recently expressed interest in refrigeration and air-conditioning equipment:

1. Van Weezel & Co., 3 Ruelle de la Fabrique, Antwerp.
2. Flor. Heynen, 34 Ave. de la Vieille Barriere, Merxem.
3. Phoenix Nouveau, S.A., 31 rue du Phoenix, Ghent.

It will interest you to know that the 1932 edition of the "Refrigeration Directory and Market Data Book" which you were kind enough to furnish this office a few years ago has proved to be very useful since frequent reference has been made to it not only for the purpose of supplying the names of American manufacturers and exporters of refrigeration equipment to Belgian firms but also for other useful information contained therein. JOHN C. WILEY,
American Consul General.

A Suggestion for the 'Around the World' Book

M. Glen Miller, Advertising
8 South Michigan Ave.
Chicago, Ill.
Mar. 10, 1937

Publisher:

If you are planning to send out an announcement when George Taubeneck's book is ready for sale, will you please put my name on the list.

This series of articles is one of the finest things I have ever read and I would like to have the information in book form. This is probably the closest I shall ever come to a round-the-world tour and I appreciate that I was able to take the trip by such a satisfactory proxy. Everything I would want to see and learn has been fully covered.

It would be nice if the refrigerator market data were either omitted or relegated to an appendix, although whether it is or not I still hope to get a copy of the book.
CATHERINE C. BACKUS

DKW
Elektrik Sogutma Makineleri
Istanbul, Turkey

Dear Sirs:

Kindly renew our subscription for one year again as we do not like to miss your interesting paper.
ROBERT LIBERT

THE AIR AGE

What's the Matter with Home Air Conditioning?

By F. O. Jordan

The burden of the problem contained in the above question seems to be this, to quote a representative prospective dealer:

"It takes maybe a half hour to sell a man an oil burner, if he wants one. If he doesn't, why waste your time? Hunt yourself somebody who does.

"Next, you install the right burner selected according to the size of the house the purchaser lives in, collect your money, and—except for the usual service calls—that is that. All of the time, you know exactly where you stand, and to a cent just what your profit will be. That kind of a business is all right, it is a business man's business.

"But air conditioning! More engineering is required for a residence job than for a 10,000-seat theater. You must compute the load for every room, you must guess at the probable quantity and location of occupancy, you have to try and find places for a whole family of ducts which will suit everybody and at the same time function properly. Maybe all of the walls are offset and you have no idea what is inside of them to prevent ducts from going through.

OTHERS GET THE PROFIT

"At any rate you must call in so many trades that your equipment turns out to be the smallest end of the job, so that all you do if you get the contract is to land a job for somebody else and a headache for yourself. What kind of a business is that?

"Why should I get into a game like that, when there are other products that I can sell and know whether or not I am making a living before it is all over?"

Probably much of the trouble is the result of the common inability or reluctance of the so-called human mind to bend itself around the corners of new angles, or more elegantly, the inertia of the mind which resists because it cannot realize the necessity for changed methods to suit new or different conditions.

Most of the "brains of the industry" learned what they know about air conditioning in the heavy commercial phase of the industry where every air-conditioning installation is an individual problem, and therefore, must be "tailor made" to suit existing conditions by means of extensive and costly engineering investigations and special computations.

INFLUENCE OF 'BIG' JOBS

In this highly specialized class of work, such methods are warranted because special conditions require them, results justify them, and the profits can absorb the overhead resulting from them. Furthermore, so few are the numbers of such installations which are even similar, that nothing could be saved in production costs from mass production anyway, so that there is no incentive to standardization.

Now the graduates of this specialized school stand at the threshold of the considerably standardized and potentially standardizable domestic and small commercial field.

Frequently heard and read are expressions by air-conditioning engineers regarding even residential air conditioning to the effect that "each job must be designed for its particular requirements." This quote was taken from the last issue of a current trade journal.

Stop and think.

Complete summer air conditioning for an entire residence does not weigh a great deal less than an automobile. A considerable amount of copper or other expensive corrosion-resisting materials as well as costly machining operations work are involved. It is commonly agreed and doubtless true that summer conditioning cannot be generally accepted in his home by the ordinary fellow of the "low income bracket" about whom so much is heard, unless its cost to him is reduced to a very few hundred dollars, probably below the cost of any of "the three makes" of low-priced cars.

If this is true, can the cost of air conditioning be brought within the range of low income brackets, if each individual home installation must forever stand as an individual monument of engineering achievement and special tailormade equipment?

TAILOR-MADE SYSTEMS COSTLY

It seems an obvious truth that if each residential installation must be specially tailormade to fit each job, then its cost will make certain that it remains a luxury which only the well-to-do can afford.

But is this true? To anyone who has not estimated the summer heat load for a great number and variety of residential jobs, it may be a surprise to learn that in any section of the country, this type of work falls into but two general classifications as to load — the insulated home and the uninsulated home, and that after all due allowance is made for outside air loads, occupancy loads, average window loads, etc., a certain refrigeration and air-conditioning unit naturally will handle insulated houses within a certain definite range of cubical volume, and uninsulated houses between a certain definite smaller range of cubical volumes.

For although the loads may not figure exactly the same, the variation will not be great enough to effect the equipment selection.

Since this is true, why not eliminate all load estimates on this type of work by rating the various units of a line of equipment in the average range of house volumes that it will serve, separate tables being made for insulated and uninsulated homes, and for each of three or four sections of the country divided upon the basis of prevailing outside conditions?

Even the load distribution between the various rooms necessary for sizing ducts or room units has been determined with sufficient accuracy by the use of simple proportioning factors.

When such simple design methods are used, it is advisable to provide means of adjusting equipment and duct capacities to balance the actual loads in order to incur balanced operation and distribution, but such features may not safely be omitted in any event, regardless of how scientifically the load estimate is made.

'STANDARDIZED SECTIONS'

In new residences in which the design may be regulated to fit the requirements of air conditioning, and for existing residences now provided with suitable duct systems, the "central system" type of air-conditioning equipment may be employed. However, in many cases the installation of a suitable duct system obviously is out of the question, and the far-sighted manufacturer will provide both "central and room type" units.

A long stride forward will have been made when conventional design offers the equipment built up of "standardized" sections, such as a "filter section," containing the filters and forming the base, a "mechanical section" containing fans and motors, and a "coil section" containing cooling and heating coils. Such standard sections could then be arranged by the contractor on the job to suit its peculiar conditions.

For example, the same sections could be assembled into horizontal or vertical units either for remote compressor or "self-contained" service, and either for central system or room unit application, and with intake and discharge in any direction.

Obviously the manufacture of a very few types of standardized section from which almost any style of unit could be assembled in the field to suit the particular installation would tend toward "mass production" manufacture, would greatly reduce the stock necessary for the contractor-distributor to carry, and would greatly simplify the problems of equipment selection.

Combining the use of the "canned engineering," or simplified field engineering methods with the standardized equipment design described goes a long way toward resulting in the "business man's business" so longed for by the hard-headed contractor who is looking for a "package" which he can merchandise, install, and get paid for, knowing all of the time where he will be when he is through.

Is Heating Plant Duct Work Suitable for Cooling?

Townley Metal & Hardware Co.
200 Walnut St.
Kansas City, Mo.

F. O. Jordan:

At present time a great many heating jobs of the forced draft type are being installed in new homes. This kind of heating plant requires the installation of a complete duct system.

After the job has been engineered from a heating man's point of view and the proper size of the ducts determined to properly handle the hot air in the winter time, the question is then raised as to whether or not the ducts are of the proper size to handle cool air, if at some future time a cooling unit were installed in the basement.

I have had so many conflicting reports and answers on this question that I am writing to a number of different magazines, manufacturers and distributors to get their reaction to this question. It would be greatly appreciated if you would advise me what your belief is in this matter.

W. W. TOWNLEY

Answer: During many years experience as registered consulting engineer in Michigan, the air-conditioning editor has never experienced any such difficulty.

Generally the winter heating load for a given room is somewhere around three times as much as the summer cooling load.

This means that the temperature differential between room air and entering air supply in winter must be about three times as great as in summer, if summer and winter conditioning are to be accomplished by the same air-circulating system.

A differential commonly used in summer is 15°. On this basis the winter differential would be about 45°. Assuming a room winter temperature of 70°, this would require a register temperature of only 115°, a very low one, as register temperatures up to 170° are quite satisfactory. Obviously no difficulty would be experienced if the heating load were greater even than six times as much as the cooling load.

On the other hand if the heating load is less than the figures given above, still no difficulty is involved, for the summer differential may be reduced as desired merely by providing a fixed summer air by-pass opening around the cooling coil.

Any difficulties that are likely to result will come from improper sizing and spacing of the air supplies to the rooms. If the supplies are at the floor, trouble will be experienced during cooling service. The best cure for this condition is to provide deflectors before the supply openings which will "shoot" the air almost vertically upward to the ceiling.

For cooling work, the room supplies should be located in the walls above the head height and directed to discharge toward the regions of greatest heat gain. Contrary to some house heating men's ideas, this overhead arrangement works best for winter heating service also.

It has been demonstrated many times that with proper design, no difficulty is experienced whatever.

These matters are discussed in "Air Conditioning Made Easy," air-conditioning manual by F. O. Jordan now being published in serial form in AIR CONDITONING AND REFRIGERATION NEWS.

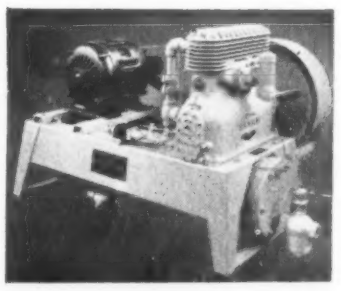
Electrostatic Air Filter Removes Charged Ions

Interesting as a possible future appurtenance for the air-conditioning unit is the electro-static air filter used for filtering circulated air in a telephone exchange building in Pittsburgh.

The function of the filter is to freshen and eliminate stuffiness from the conditioner room by removing the breath particles from the air. The scientific basis of the operation of this filter is the one advanced by Dr. G. R. Wait (Carnegie Institute of Washington) to the effect that exhaled breath contains 200,000,000 ion particles which are positively and negatively charged in equal proportions.

The action of the electric filter is to so neutralize these electrically charged particles that they are removed from the air as it circulates through the filter.

● With hot, humid days just ahead, there's "Gold on Main Street" for distributors of Baker's complete line of Air Conditioning and Refrigeration equipment. With more than 30 years experience in manufacturing and developing all types of mechanical cooling equipment, Baker offers distributors full factory cooperation in sales and engineering problems. Responsible firms are invited to write us about several profitable territories still open to dealers and distributors.



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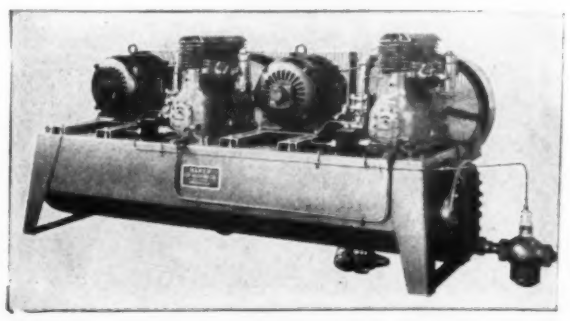

The Baker Dual Condensing Unit with Automatic Capacity Control for economy of operation and reserve capacity to meet the variable loads of Fall, Winter, Summer and Spring.

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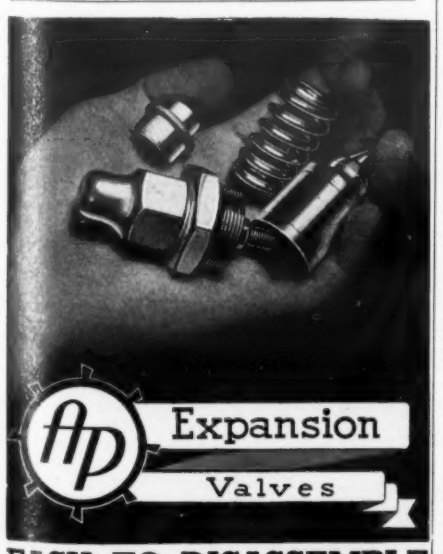

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Simply remove large hexagon nut on bottom of valve and parts drop into your hand. A-P Expansion Valves are available in a full range of sizes up to 15 tons "Freon" Capacity, and for all modern low-pressure refrigerants.

Automatic Products Company
2450 North 32nd St., Milwaukee, Wis.

For the Air-Conditioning Distributor-Contractor

This is No. 7 in the series, "How to Select and Install Air-Conditioning Systems" by T. H. Mabley, chief engineer for a Detroit air-conditioning distributor.

Drawing on his experience with this and other contracting firms Mr. Mabley outlines the procedure in selecting and installing equipment for specific applications, and discusses any special features of the job.

Previous articles in this series have been published as follows:

Case No. 1, A Single Office (Jan. 6); No. 2, A Conference Room (Jan. 13); No. 3, Residence System with Room Cabinets (Jan. 20); No. 4, Typical Commercial Application—A Shoe Store (Feb. 3); and No. 5, A Beauty Parlor (Feb. 3); No. 5, A Beauty Parlor Feb. 24); No. 6, A Coffee Shop (March 3); No. 7, A Process Job (March 10); and No. 8, A Doctor's Suite (March 17).

HOW TO SELECT AND INSTALL AIR-CONDITIONING SYSTEMS

By T. H. Mabley, Chief Engineer
Mechanical Heat & Cold, Inc., Detroit

Case No. 9

Central System for A Group of Offices

Often the contractor-dealer must handle an air-conditioning problem in which it is necessary to use a central unit and distribute conditioned air by means of a system of ductwork to the various conditioned areas.

We will thus consider an office located on the second floor of a two-story factory building. The layout consists of a general office, three smaller private offices, and a drafting room, all of which are separated by full partitions. The area has three exposures, but the sun load is materially reduced by the use of Venetian blinds. This reduction in load, it is recognized, is not quite as great as would be possible if awnings were used, but the owner has a decided preference for the shades.

In considering the desired functions of the proposed air-conditioning system, we learn that for the present time the buyer of the equipment is interested only in the operating of the conditioner during the summer months, and primarily for the purpose of cooling and dehumidifying the offices.

In the manufacturing district where this building is located, the outside air is laden with smoke and dirt particles so it is evident that plans for cleaning the air should be included. Usually some means for filtering the air can be included in any installation requiring one of the major air-conditioning functions at only a slight additional cost to the buyer.

It must be mentioned, however, that this plan for filtering will be effective only when the unit is in operation. In the case under consideration, the owner intends to operate the system only during the summer months, and perhaps during mild weather when circulation and introduction of some fresh air is particularily desired. Thus the facilities for filtering are limited.

Since we do not intend to provide a tempering coil, this unit cannot be operated for filtering and air circulation when the outside air might be at so low a temperature as to cause discomfort to the occupants in the form of a cold discharge of air from the supply grilles. At some future date, it is probable that the owner will wish to operate the system during the entire year, so provision will be made for the addition of a tempering coil whenever desired.

Next step is to select the performance design conditions so that a load calculation may be made. In this case the inside condition of 78° dry bulb and 50% relative humidity will be desired when the outside temperature is 93° dry bulb and 75° wet bulb.

A slightly higher differential may be expected with a higher outdoor temperature, and on the other hand the differential will be gradually reduced as the outside temperature goes below the design condition. Only the one set of conditions will be used to compute the heat gain load on the system.

In making the cooling load calculation each office must be considered separately as each must have its own supply of conditioned air. This means that we will take the figures for building loss, sun loss, occupancy, lighting and ventilation for each room and from this data arrive at the heat gain for each of these portions of the condensing area.

Of course, in figuring the heat gain it will not be necessary to figure any heat gain across the partitions that are adjacent to other cooled areas; a 12° temperature differential may be used for partitions adjacent to the wash rooms and store rooms, while in the partition to the factory space a 15° differential should be used. After determining the total heat gain for each room we can then proportion the air volume to each room based on the direct proportion of the heat gain for any room as compared with the total for the entire job.

The total c.f.m. for the entire installation is selected after we arrive at a total load figure. In this case a unit is chosen to handle the total load having a capacity of 4,000 c.f.m.

The following shows the individual room loads, which were calculated in the usual manner, and also the proper proportionate quantities of air for each space.

Space	Total Heat Gain (B.t.u.)	Quantity of Air (C.f.m.)
General Office	41,500	1,515
Office No. 1	14,100	515
Office No. 2	14,800	540
Office No. 3	26,200	955
Drafting Room	13,000	475
Totals	**109,600**	**4,000**

Since all of the above cooling loads are in approximately the same ratio of sensible heat to total heat, we will not be too concerned if the air introduced into each room has the same dew point and thus will give an average performance ratio.

This would mean that the relative humidity might be slightly higher in some rooms and a little lower in others, but the variation will be inappreciable in this particular application. With these figures we can now proceed with the installation layout.

In studying the physical details of the building it is concluded that the best arrangement for this installation will be to locate the air conditioner in the factory space and hang it from the roof beams of the building. Since the ceiling of the office space is a dropped ceiling, there is considerable space between it and the roof which may be used for running the ductwork.

Because of the sun rays directed on the roof this space will naturally be rather warm. For this reason the owner will insulate the ceiling of the office, and the ducts may be covered at the same time. This will be done simply by carrying a thick blanket of insulating material up the sides and across the top of the duct instead of insulating the ceiling space covered by the duct. Some method must be employed to hold this thick insulation blanket from sliding off the duct after it has been installed.

Air will be introduced into each room by means of a circular discharge grille approximately in the center of each space. This grille should be equipped with some arrangement for blocking off any portion of the grille or deflecting the air from any point that might be a source of annoying high velocity blasts of air. This might be just at the point where an occupant would normally be seated most of the day or near some wall projection close to the air discharge.

All the recirculated air in this case will be carried into the hallway from the offices and directly from the general office to the recirculating grille. This opening for the return air to the unit is located above the stairs, because it is the only place in the general office that might not be too close to a seated occupant. This eliminates the danger of possible complaints from too much air circulation at any point.

Fresh air is taken in from a louvre in the top of the factory space window. This eliminates cutting the roof and any danger of causing leaks.

The unit selected is a standard conditioning unit complete with blower, motor, belt drive, direct-expansion cooling coil, filters and space for the future addition of a tempering coil and humidifier. The cooling compressor will be located directly below the conditioner, thus making a very short run for the refrigerant piping.

Figuring Ductwork

The sizing of the duct system is a feature of this problem worthy of detailed discussion. There are several methods now being used, and there are many good reasons for the use of each. In subsequent chapters we will illustrate several schemes.

For the first case we will use the so-called total pressure drop method. The main principle involved in this type of procedure is the equalizing of the static pressure throughout the entire duct system so that the pressure drop from the fan to each air supply outlet is the same. This assures distribution of air through the several ducts and branches in the designed quantities.

The flow of air through a duct system is similar to the flow of water through a pipe system; larger pipes will handle more water than smaller pipes with the same pressure drop, provided the lengths are equal. If we have a certain quantity of air to pass through certain air ducts we can size that duct to pass just that quantity of air with a certain pressure drop.

First step is to refer to standard air friction and velocity charts such as are available in almost any good air-conditioning data book. If we study our proposed layout we can select the longest possible length of air travel, or at least that path of air to any particular outlet that will tend to have the greatest pressure drop in the system.

The duct system is then divided up into sections, each change in size of duct marking the beginning of a new section. The total static pressure drop is then determined by finding the sum of the pressure drops in each section through which the air has to pass before it gets to the discharge opening previously selected.

This means that this part of the duct system must first be sized, which is done by selecting a duct size based on recommended air velocities. When we have the velocity and the quantity of air handled in each section we can then determine the duct size and the pressure drop per hundred feet. From this figure we can get the actual drop for each section and our total for all the sections represents the total static pressure drop which we will use in the balance of our calculations.

In selecting the equivalent length of duct in each section we measure the actual length and then add 10 feet for each elbow turn in the section of the duct. The calculations shown give the detailed figures of the total pressure drop between the unit outlet and the Office No. 3 discharge grille.

This is the longest run of air travel and all the other runs from the fan to the outlet in each case will be sized for the total of .0598 inches of water static drop.

For example, branch "B" must be of such a size that the pressure drop through branch "B" plus the pressure drop through section "A" is equal to .0598 inches of water.

From the table above, the pressure drop through section "A" is .0108 inches of water, so that the pressure drop through branch "B" must be .049 inches of water. Therefore, since branch "B" has an equivalent length of 25 feet, its rate of pressure drop per 100 feet must be four times .049 inches of water, or .196 inches of water per 100 feet.

From a friction chart, branch "B" must be 15 inches in diameter in order to carry 1,515 c.f.m. of air with a pressure drop per 100 feet of .196 inches of water.

The rest of the system is sized in the same manner.

A table for square duct dimensions for equivalent round ducts may be referred to in selecting the actual square duct sizes which should be installed on this job.

Layout for Office Group Installation

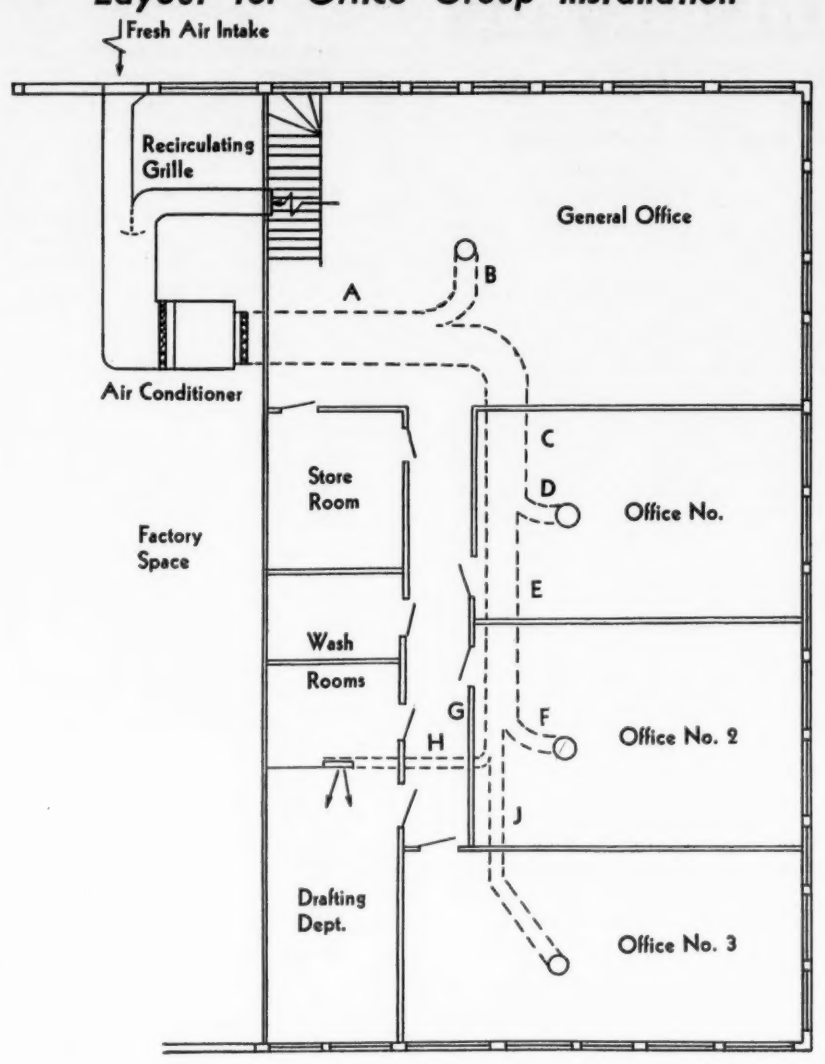

Table for Determining Pressure Drop in Duct System

Section of Duct	C.f.m.	Recommended Velocity	Duct Diameter (Equiv. Round)	Equiv. Length	Drop Per 100 Feet	Total Drop
A	4,000	1,200	23 Inches	12 Feet	.090	.0108
C	2,485	1,000	22 Inches	24 Feet	.080	.0192
E	1,970	900	20 Inches	15 Feet	.070	.0105
G	1,430	800	18 Inches	2 Feet	.065	.0013
J	955	700	16 Inches	30 Feet	.060	.0180
Total Pressure Drop, Inches of Water (Static)						.0598

Section of Duct	C.f.m.	Equiv. Length	Pressure Drop Equal to Section	Actual Drop	Drop Per 100 Ft.	Duct Diam.	Duct Vel.
B	1,515	25 Ft.	C, E, G, and J	.0490	.196	15 In.	1,270
D	515	23 Ft.	E, G, and J	.0298	.129	11 In.	800
F	540	24 Ft.	G and J	.0193	.080	12 in.	670
H	475	30 Ft.	J	.0180	.060	16 In.	700

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— AIR CONDITIONING ENGINEERING —

Carrier Recommends Sharing Engineering Experience to Prevent Injury to Public Confidence in Air Conditioning

PHILADELPHIA—The address on "Technical Aspects of Air Conditioning" delivered here by Willis H. Carrier, chairman of the board of Carrier Corp., before the National Oil Burner and Air Conditioning Exposition came as a danger warning from the "dean of air conditioning."

According to Mr. Carrier, the public lack of confidence in air conditioning which can result from unsatisfactory installations made by inexperienced or unqualified engineers and contractors constitutes so serious a menace to the entire air-conditioning industry that it is up to experienced organizations, in their own interests, to protect the industry by passing on the results of their experience to the industry's newer units.

"You should have a vital interest in air conditioning, because your products are so easily applied to it," said Mr. Carrier to the oil-burner manufacturers present. "If air conditioning advances as rapidly as the performance of good air conditioning merits, there is room for all of us.

"On the other hand," declared Mr. Carrier, "if poor practices are indulged in, there is nothing ahead but the dead end of the road. More time is required for overcoming public prejudice created by poor installations made by irresponsible people than for creating the initial interest in the product.

"Since the success of the entire industry hinges upon satisfactory installations being made by responsible people, and since this can result only from knowledge born of experience, it is to the selfish interest of the industry's leaders who have this experience to pass it on to their newer competitors, and avoid the injury to the entire industry which must result from ill-advised installations."

Mr. Carrier stated that, contrary to popular opinion, it is less difficult to design and install a satisfactory summer cooling system for the home than to make a winter heating system whose operation will be satisfactory to the occupants of the home; it is the functioning of the residential heating system which is most likely to fall short of satisfactory performance.

According to Mr. Carrier, the two principal sources of possible danger in residential air conditioning lie in improper locations and entrant velocities of air supplies, and in intermittant operation due to the wrong kind of controls. He explained that stratification results from the down drafts at outside surfaces, especially of windows created by the falling tendency of air chilled by contact with these cool outside surfaces.

Such cold drafts, being heavier than the warmer air within the room, tend to spread over the entire floor area and remain there as a cold pool, with much warmer air above, thus resulting in illness and discomfort from hot heads and cold feet.

"Hot heads and cold feet must be avoided at all costs," declared Mr. Carrier, "and this condition can be avoided only by the elimination of stratification."

He explained that with the old direct radiator, located under the window and allowed to operate continuously, as in the case of the coal-fired installation, stratification was largely eliminated. Even in the case of the oil-burning direct-radiation installation, the results were said to be not unduly bad because of the residual heat-holding propensity of the mass of cast iron of which such radiators are made. However, the conditions maintained by the air-conditioning system on intermittent operating controls and with poorly located air supply, were said to be "awful."

Mr. Carrier explained that the air supply may be so located that an acceptable absence of stratification results during the operation of the equipment, but that during the "off cycle" of intermittently operated equipment, undesirable stratification quickly occurs. If the outside temperature is below 55° F., the tendency and degree of stratification are more aggravated.

For this reason, said the speaker, a modulating control must be used at temperatures below 55° F. which will regulate the heat output of the system to balance exactly the heat loss from the heated space, but which will permit continuous operation rather than the alternating hot blast and relatively cold periods of the intermittent or "on or off" type of control.

Mr. Carrier demonstrated the logic of this statement by calling attention to the fact that the average heating load is no more than ⅓ to ½ of the heating capacity which must be held in reserve for extreme low outside conditions.

It was also pointed out that distribution is determined by the location of the air "supply" rather than of the air "vent" or outlet. For this reason, it was stated, one central vent in a corridor or elsewhere will suffice, provided that such vent is so located that no drafts through narrow openings or spaces can result.

It was explained that when outside temperatures rise above 55° F., an intermittent control should be provided to off-cycle the equipment as necessary to balance the load, because serious stratification can exist only at lower outside temperature conditions.

The advisable inlet air temperatures allowed by the modulating control were said by Mr. Carrier to range from 100° F. during mild weather to 170° F. in very severe weather. In the event of weather so mild that the 100° F. air would overheat, the intermittent control should be brought into play.

Mr. Carrier commented that the satisfaction to the customer of the properly designed and controlled air-conditioning system more than justifies its slightly higher first cost, and that tests have proved the operating cost of modulated operation to be 15% lower than intermittent operation under average normal load conditions—not through any gain in actual burner efficiency, but from what may be termed the overall comfort efficiency of such operation.

The speaker pointed out the statistical fact of reduced illness from colds when "proper" air conditioning is used, and stated that while a portion of the beneficial results may be due to elimination of dryness and dust, most of the improvement comes from the more uniform temperatures from floor to ceiling which are maintained through the entire day by the properly installed and controlled system. He stated that such a system could maintain floor temperatures within 3° F. of the head line in a room under average conditions, and this, he declared, is much better than can be maintained by any system using direct radiation.

"This is no problem to be worked out in the future; we know how to get results now," declared Mr. Carrier in closing. "However, there probably are better ways of getting them, and I have no quarrel with other methods as long as they actually get the results."

In answering a question following the close of his talk, Mr. Carrier stated that a poor heating system actually is more conducive to ill health than no heating system, because the human being may become inured to continued exposure to cold and so be free from ill effects, whereas the fluctuating conditions resulting from intermittent operation and stratification are something to which the human body cannot become acclimated.

Air-Conditioning Equipment Installed in Laredo Hotel

LAREDO, Tex.—Following the example of San Antonio's St. Anthony hotel, air-conditioning equipment has been installed in 150 guest rooms, lobby, dining room, and service shops of the Plaza-Laredo hotel here.

Located on the recently completed International Highway between Mexico City and the United States, Laredo attracts thousands of tourists annually as the port of entry where passports must be visaed and money changed before passing from one country to the other.

Air-conditioning equipment, installed by the Houston branch of York Ice Machinery Corp., consists of two 2-cylinder compressors, supplying 46½ tons of refrigeration, and two shell-and-tube condensers, together with dehumidifying apparatus. A concealed system of air ducts, grilles, intakes and outlets is used throughout the conditioned areas.

Recent addition of two floors makes the Plaza-Laredo one of the southwest's two largest air-conditioned hotels, York men state.

2-Month Gar Wood Sales In Detroit Up 35%

DETROIT—January and February sales of Gar Wood heating and air-conditioning equipment in the Detroit area show a gain of 35% in dollar volume over the same months of 1936, reports Norman Saylor, manager of the local branch of Gar Wood Industries, Inc.

Better weather conditions and greater purchasing power on the part of home builders have been responsible for this year's increase, Mr. Saylor said. Building activities in the Detroit area, he added, have not been retarded this year as they were last.

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Government Report of Electric Refrigerator and Range Ownership by Various Income Classes in 9 Cities

City	Burlington, Vt.		Casper, Wyo.		Des Moines, Iowa		Erie, Pa.		Frederick, Md.		Lansing, Mich.		Oklahoma City, Ok.		Portland, Ore.		Paducah, Ky.	
No. Families Reporting	705		1,146		5,707		5,227		918		1,821		5,577		7,601		1,831	
Type of Appliance	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range	Ref.	Range
% Total Saturation	15.2	3.0	16.8	0.3	17.8	0.2	9.4	0.1	22.5	6.8	12.3	5.3	26.8	0.2	19.6	18.6	6.7	0.2
No. Units in Use	107	21	193	3	1014	10	489	2	207	62	224	96	1493	13	1490	1416	122	4
Distribution% by Income Classes.																		
No Income	0	0	1.0	0	0.9	10.0	2.0	0	1.9	0	1.8	1.0	3.2	0	3.3	3.0	1.6	0
$ 1-$ 499	3.7	9.5	1.6	0	2.8	0	4.7	0	3.4	4.8	5.8	7.3	5.4	7.7	5.8	8.1	6.6	0
$ 500-$ 999	7.5	14.3	7.8	0	8.2	20.0	9.8	0	9.7	16.1	6.7	10.4	9.1	0	14.5	13.9	7.4	0
$1,000-$1,499	14.0	28.6	14.5	0	16.0	20.0	21.3	0	28.5	25.8	23.7	19.8	19.9	15.3	19.4	22.2	14.8	25.0
$1,500-$1,999	19.6	9.5	23.3	66.7	22.9	20.0	18.0	0	16.4	12.9	19.2	18.8	19.7	23.1	22.3	21.5	30.3	25.0
$2,000-$2,999	21.5	4.8	27.4	0	26.1	30.0	23.3	50.0	23.7	19.4	21.4	19.8	20.7	23.1	19.7	18.4	20.5	50.0
$3,000-$4,999	15.9	19.0	16.6	0	16.8	0	12.9	0	11.1	17.8	15.2	15.6	13.7	23.1	10.9	9.7	13.1	0
$5,000-$6,999	17.8	14.3	7.8	33.3	3.0	0	8.0	50.0	5.3	3.2	6.2	7.3	4.9	7.7	2.6	2.3	5.7	0
$7,000 and Over					3.3	0							3.4	0	1.5	0.9		
Saturation % by Income Classes.																		
No Income	0	0	3.4	0	3.9	0.4	1.9	0	40.0	0	5.2	1.3	25.0	0	11.7	10.0	2.0	0
$ 1-$ 499	3.5	1.8	1.5	0	3.0	0	1.8	0	3.7	1.6	3.4	1.8	7.7	0.1	4.9	6.4	1.1	0
$ 500-$ 999	4.8	1.8	6.8	0	6.4	0.2	3.7	0	7.7	3.8	2.9	1.9	11.6	0	11.8	10.1	2.4	0
$1,000-$1,499	9.6	4.8*	11.4	0	12.8	0.2	10.6	0	26.1*	7.1*	13.3*	4.8*	23.5	0.2	20.3	22.1*	6.9	0.4
$1,500-$1,999	20.0	1.9	20.5	0.9*	25.9	0.2	16.6	0	31.5	7.4	20.9	8.7	36.5	0.4*	31.2*	28.5	18.7*	0.5
$2,000-$2,999	29.5*	1.3	41.1*	0	39.3*	0.4*	28.6*	0.3*	66.2	16.2	29.3	11.6	46.7*	0.5	41.8	37.2	21.2	1.7*
$3,000-$4,999	38.6	9.1	62.7	0	55.7	0	42.3	0	62.2	29.7	54.0	23.8	67.9	1.0	54.3	46.0	41.0	0
$5,000-$6,999	82.6	13.0	83.3	5.6	55.6	0	62.9	1.6	73.3	13.3	73.7	36.8	92.4	1.3	84.4	71.1	58.3	0
$7,000 and Over					73.3	0							36.4	0	81.5	48.1		

*Indicates income group in which largest number of appliances are owned.

— SALES STATISTICS —

Government Survey Reveals Significant Data on What Income Groups Buy Most Electric Refrigerators and Ranges

WASHINGTON, D. C.—Significant data on the use of mechanical refrigerators and electric ranges by lower, middle, and upper income classes are indicated in consumer reports on nine selected cities just compiled by the Marketing Research Division of the Bureau of Foreign and Domestic Commerce.

Covered in the reports are Portland, Ore.; Casper, Wyo.; Erie, Pa.; Burlington, Vt.; Oklahoma City; Paducah, Ky.; Frederick, Md.; Des Moines, Iowa; and Lansing, Mich.

Since the cities were selected for study because of their essential differences from each other in size, family composition, occupational characteristics, and location, accurate comparisons are difficult. Following, however, are some highlights which may aid in sizing up the markets individually and as a group:

Reported incomes ranged from none at all to more than $15,000. Less than 1.5% of the reporting families in each of the cities had incomes above $5,000; and, in every city, at least 40% of the families had incomes of less than $1,000 for the year (1933) covered. Also, from 3 to 6% of the families in each city said they were without income of any sort during the year.

There are in each city considerably more than three times as many families with incomes between $1,000 and $2,000 as there are families with incomes between $2,000 and $3,000. About 6% of all reporting white families had incomes of $3,000 or more.

Mechanical refrigerators, the report shows, are owned by two-fifths to three-fourths of all families reporting incomes of $3,000 or more for the year.

Individually, in the saturation point on electric refrigerators, the cities ranged from a high of 26.8% for Oklahoma City, to a low of 6.7% for Paducah. In between were Burlington, with a percentage of 15.2; Casper, with 16.8; Des Moines, with 17.8; Erie, with 9.4; Frederick, with 22.5; Lansing, with 12.3; and Portland, with 19.6.

HOME OWNERS LEAD

In every city, there is a greater proportion of refrigerator ownership among owner-occupant families than among tenants. Also, in cities where two or more races are considered (such as Oklahoma City, Paducah, Frederick, Des Moines, and Lansing), the proportion of all reporting white families having refrigerators is at least five times as large as the percentage of Negro families using this equipment.

Relationship between income and the use of mechanical refrigeration is revealed by the fact that, despite the relatively low percentage of families having incomes of $2,000 or more, at least 35% of the families using refrigerators in each city were in this income group.

Due to the large number of families in the $1,000 to $2,000 group, however, this class is shown in the report to be a factor worthy of consideration in the planning of sales and advertising campaigns.

For example, in Burlington 55.2% of the refrigerators reported in use were owned by families with incomes of $2,000 or more; in Casper, 51.8%; in Des Moines, 59.2%; in Erie, 44.2%; in Frederick, 50.1%; in Lansing, 52.8%; in Oklahoma City, 52.7%; in Portland, 34.7%; and in Paducah, 39.3%.

The greatest number of refrigerations, however, went in most cases to the income class between $2,000 and $3,000. This was the case in Burlington, Casper, Des Moines, Erie, and Oklahoma City. In Portland and Paducah, the $1,500 to $2,000 class owned the most units; in Frederick and Lansing, the $1,000 to $1,500 class.

As the income groups advanced, the percentage of refrigeration use rose also, generally speaking. This is to be expected, and, because of the relatively small number in the higher groups—$5,000 and over, for example, —is not particularly significant to the merchandiser, except to show him that the bulk of this potential market lies in the income groups within the $1,000 to $5,000 range.

In the use of electric cookery, however, a vastly different story is presented by the survey. While from 90 to 99% of the families in eight of the cities (and about 75% in Paducah) use electricity for lighting, only city to show an appreciable use of ranges is Portland, with 18.6% of the families studied reporting ownership.

From that high, the percentages range downward to as low as 0.1%, in Erie, with Des Moines, Oklahoma City, and Paducah showing but 0.2%, Casper 0.3%, Burlington 3.0%, Lansing 5.3%, and Frederick 6.8%.

For a comparison of range and refrigerator ownership where saturation points of the two appliances are comparable, Portland offers an interesting study.

PORTLAND COMPARISON

Range saturation is 18.6%; refrigeration saturation, 19.6%. Distribution by income groups is also closely similar, as is shown by the following figures:

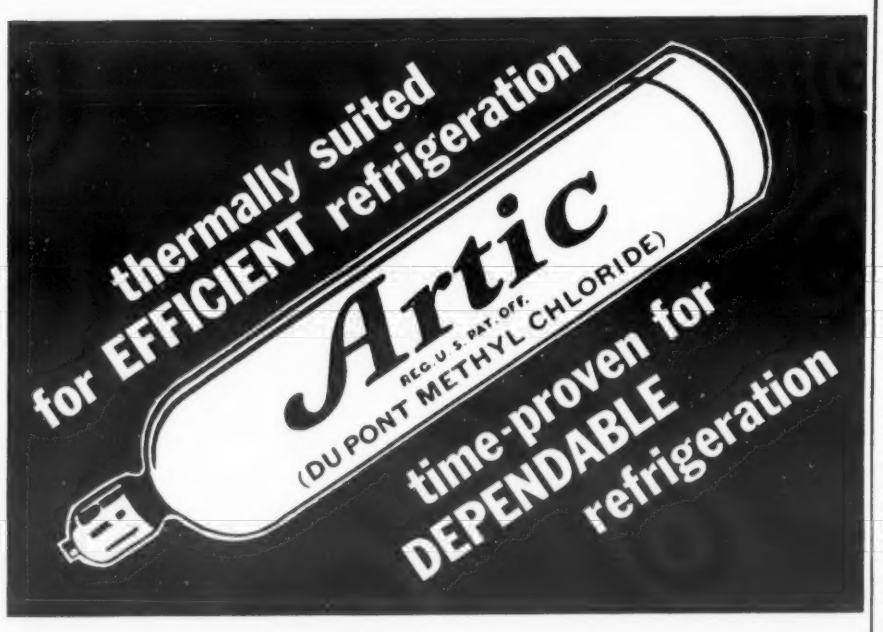
"No income" group: refrigerators 3.3%, ranges 3.0%; $1 to $500: refrigerators 5.8%, ranges 8.1%; $500 to $1,000: refrigerators 14.5%, ranges 13.9%; $1,000 to $1,500: refrigerators 19.4%, ranges 22.2%; $1,500 to $2,000: refrigerators 22.3%, ranges 21.5%; $2,000 to $3,000: refrigerators 19.7%, ranges 18.4%; $3,000 to $5,000: refrigerators 10.9%, ranges 9.7%; $5,000 to $7,000: refrigerators 2.6%, ranges 2.3%; $7,000 and over: refrigerators 1.5%, ranges 0.9%.

A glance at the accompanying table will also show a distinct similarity in the saturation by income classes of the two appliances.

As in the case of refrigeration, a larger proportion of owner-occupant families cook electrically than do tenant families. Also, as was generally true with refrigerators, higher income families tend to show a greater use of electricity for cooking than do those in the next lowest income group.

New York, Pennsylvania, California Lead Jan. Sales by States

States and Territories	Quantity Household Low Sides
Alabama	1,392
Arizona	605
Arkansas	590
California	12,888
Colorado	1,488
Connecticut	3,959
Delaware	267
District of Columbia	850
Florida	4,095
Georgia	3,808
Idaho	876
Illinois	12,857
Indiana	3,803
Iowa	3,441
Kansas	2,506
Kentucky	1,164
Louisiana	1,389
Maine	439
Maryland	1,643
Massachusetts	6,006
Michigan	7,923
Minnesota	2,847
Mississippi	778
Missouri	4,592
Montana	544
Nebraska	1,549
Nevada	177
New Hampshire	510
New Jersey	6,209
New Mexico	250
New York	15,639
North Carolina	3,603
North Dakota	349
Ohio	8,834
Oklahoma	1,250
Oregon	1,266
Pennsylvania	14,637
Rhode Island	1,387
South Carolina	1,741
South Dakota	453
Tennessee	2,388
Texas	5,729
Utah	760
Vermont	344
Virginia	2,498
Washington	2,787
West Virginia	1,493
Wisconsin	4,563
Wyoming	251
Total United States	**159,417**
Canada	1,734
Other Foreign (Including U. S. Possessions)	11,607
Total For World	**172,758**



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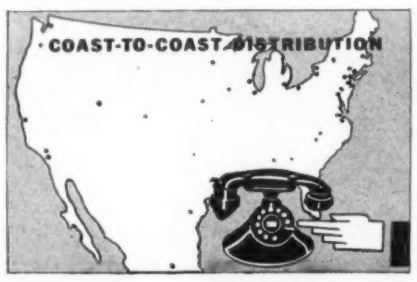

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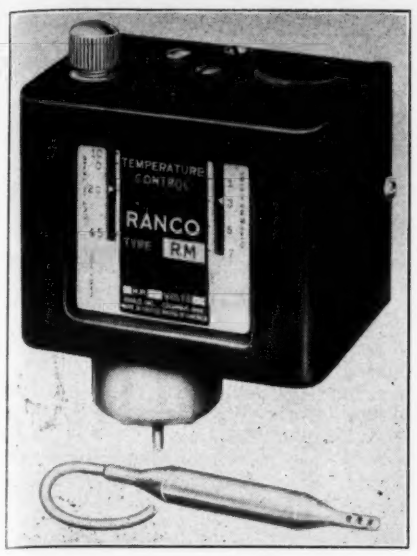
-COMMERCIAL REFRIGERATION-

New Ranco Control



Ranco's new type RM for use where close control is needed.

* * *

Ranco Introduces New Type RM Control

COLUMBUS, Ohio—Ranco, Inc., has announced the new type "RM" temperature and pressure control, a combination of an auxiliary switch mechanism, operated by a temperature or pressure bellows, and a magnetically operated contactor.

The auxiliary contacts require very little power for operation, making possible a differential as low as 1° or less, which is adjustable up to 7°. The main contacts are closed by the magnet under heavy pressure with quick make and break, providing a current-carrying capacity of 1 hp. 110-220 v. a.c., or 1 hp. 115-230 v. d.c.

The control is available in temperature ranges from —20° F. to 90° F. BX, or conduit outlets, are provided on the top and bottom of the control, directly in line with terminals. Overall dimensions of the control are: depth, 2⅝ inches; width, 3 9/32 inches; height, 2½ inches.

The control is designed particularly for use where temperature or pressure must be held to very close limits to compensate for the over-run caused by the inherently sluggish characteristics of other units comprising the heating or cooling system.

Counter Freezer Users Sponsor Ice Cream Week April 18-24

CHICAGO — National Ice Cream Week, sponsored by manufacturers and users of counter freezers and others interested in the production and sale of ice creams and ices, will be observed this year from Apr. 18 to 24.

Special displays, advertising, and selling activities will mark the week. The Counter Freezer Association has prepared special window strips for use of member dealers during the period.

The week will be featured on several nationwide radio programs, including those starring Guy Lombardo's orchestra, Bing Crosby, Bob and Babs, as well as on the "Man on the Street" and "While the City Sleeps" broadcasts.

Suits Threaten Berry Pre-Cooling Setup

NEW ORLEANS — Suits which threaten the entire pre-cooling setup of the Louisiana strawberry belt were filed in federal court here by the Phillips Refrigeration Products Corp. of San Francisco.

In two complaints filed against growers of Hammond, strawberry center 50 miles north of this city, the Phillips company asks an injunction against further use of refrigeration machinery owned by the defendants, claiming that it was made in violation of the corporation's patents.

The suits are regarded as test cases aimed at the dozen pre-cooling firms operated in southeastern Louisiana. The two defendants are not commercial operators, operating their machinery only for their own uses, but the equipment is much the same as that used by commercial firms and berry associations throughout the district.

The Phillips company claims to have recently won by default similar suits on the Pacific coast.

Milk Dealers and Ice Cream Makers to Convene in Dallas, Oct. 18-23

DALLAS—Joint convention of the International Associations of Milk Dealers and Ice Cream Manufacturers will be held here from Oct. 18 to 23. Displays by members of the Dairy and Ice Machinery and Supplies Association, Inc., are expected to feature the meeting.

Rex Opens Branch Store In Decatur, Ill.

DECATUR, Ill.—Rex Refrigeration Co., commercial refrigeration and air-conditioning dealer with headquarters at Lovington, Ill., has opened a branch store at 245 E. Main St. here, with Ray Widick as manager. R. A. Boggs is general manager of the organization.

'Family Buying Mood' Yields Sales of 4 Cases, 2 Units

SYRACUSE, N. Y.—Max Hutchinson, of Hutchinson-Shorer Co., General Refrigeration distributor here, took advantage of a "family" buying mood to sell four display cases and two Lipman refrigerating units recently.

On one after-dinner call, Mr. Hutchinson sold a store owner two cases and a condensing unit. Returning home, he stopped in at a store operated by the new customer's sister, and duplicated the order.

Farm Cooperative Employs Refrigerated Truck

PAYETTE, Idaho—The Farmers Cooperative Creamery Co. has recently put into use in this section an ice cream truck refrigerated by a ¾-hp. Kelvinator condensing unit and a Kold-Hold cooling unit. An electric motor operates the condensing unit at night while the truck is in its garage.

Nema Manufacturers Report January World Sales Of 13,777 Commercial Condensing Units

The following reports of commercial refrigerating and air-conditioning equipment sales for January and February, 1937, were made to the Commercial Refrigeration Section of the Refrigeration Division of the National Electrical Manufacturers Association (Nema) by the following 15 companies:

Brunner Manufacturing Co., Carrier Engineering Corp., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigeration Corp., Kelvinator Corp., Leonard Refrigerator Co., Merchant & Evans Co., Norge Corp., Servel, Inc., Uniflow Manufacturing Co., Universal Cooler Corp., Westinghouse Electric & Manufacturing Co., York Ice Machinery Corp.

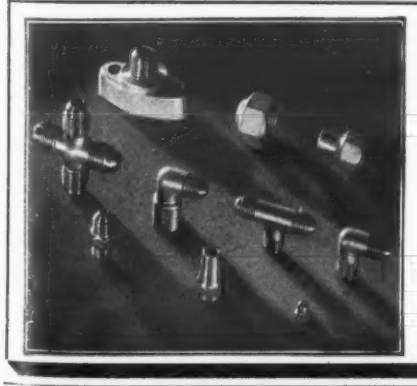
SALES FOR JANUARY, 1937

	Domestic Quantity	Domestic Value	Canadian Quantity	Canadian Value	Other Foreign Quantity	Other Foreign Value	Total World Quantity	Total World Value
1. Bottle Water Coolers—Complete	181	$ 10,053	.....	$	24	$ 2,374	205	$ 12,427
2. Pressure Water Coolers—Complete	563	60,628	.....	.....	39	4,514	602	65,142
3. Water Coolers—Low Side Only	40	2,797	.....	.....	5	253	45	3,050
4. Ice Cream Cabinets—Complete	1,612	225,292	.....	.....	181	15,355	1,793	240,647
5. Ice Cream Holding Cab. Only (Remote)	790	112,351	1	129	9	1,309	800	113,789
6. Bottled Beverage Coolers—Complete	1,050	88,103	.....	.....	30	2,169	1,080	90,272
7. Milk Cooling Cabinets (No High Sides)	201	12,282	.....	.....	8	490	209	12,772
8. Air Conditioners—Self-Contained	398	92,690	1	184	183	43,824	582	136,698
9. Air Conditioners—Floor Type (No High Sides)	213	107,277	.....	.....	10	4,825	223	112,102
10. Air Conditioners—Ceiling (Cooling Only—No High Sides)	176	30,977	.....	.....	21	2,978	197	33,955
11. Air Conditioners—Ceiling Type (Equipped for Heating—No High Sides)	64	33,525	.....	.....	1	530	65	34,055
12. Air Conditioners—Residential Type (No High Sides, Boilers, or Furnaces)	27	7,370	.....	.....	4	2,000	31	9,370
13. Condensing Units Less Than ⅓ Hp.	1,251	56,665	8	510	153	9,459	1,412	66,634
14. Condensing Units—⅓ Hp.	2,015	153,575	15	1,304	770	62,084	2,800	216,963
15. Condensing Units—½ Hp.	1,586	158,355	27	3,136	300	33,090	1,913	194,581
16. Condensing Units—¾ Hp.	996	133,004	20	2,849	92	12,994	1,108	148,847
17. Condensing Units—1 Hp.	709	115,269	9	1,601	51	8,787	769	125,657
18. Condensing Units—1½ Hp.	523	106,123	2	438	64	14,293	589	120,854
19. Condensing Units—2 Hp.	180	42,635	.....	.....	20	4,205	200	46,840
20. Condensing Units—3 Hp.	233	66,197	.....	.....	35	8,580	268	74,777
21. Condensing Units—5 Hp.	133	60,576	.....	.....	4	1,635	137	62,211
22. Condensing Units—7½ Hp.	68	43,488	.....	.....	1	702	69	44,190
23. Condensing Units—10 Hp.	84	66,695	.....	.....	3	2,179	87	68,874
24. Condensing Units—15 Hp.	83	75,860	.....	.....	3	2,105	86	77,965
25. Condensing Units—20 Hp.	53	60,655	.....	.....	2	2,168	55	62,823
26. Condensing Units—25 Hp.	22	28,335	.....	.....	.....	.....	22	28,335
27. Total Lines 13 to 26 Inclusive	7,936	.....	81	.....	1,498	.....	9,515	.....
28. Total Lines 1, 2, 4, 6, 8, and 27	11,740	.....	82	.....	1,955	.....	13,777	.....
29. Commercial Evaporators (Not Reported Above)	2,600	82,164	135	3,713	843	25,231	3,578	111,108
30. Air-Conditioning Evaporators (Not Reported Above)	298	89,363	.....	.....	.....	.....	298	89,363
31. Total Commercial & Air Conditioning	.....	$2,122,304	.....	$13,864	.....	$268,133	.....	$2,404,301

February Commercial Sales by Nema Manufacturers Rise to World Total of 14,977 Condensing Units

SALES FOR FEBRUARY, 1937

	Domestic Quantity	Domestic Value	Canadian Quantity	Canadian Value	Other Foreign Quantity	Other Foreign Value	Total World Quantity	Total World Value
1. Bottle Water Coolers—Complete	597	$ 36,325	.....	$	21	$ 2,002	618	$ 38,327
2. Pressure Water Coolers—Complete	904	89,581	2	176	117	13,154	1,023	102,911
3. Water Coolers—Low Side Only	108	14,510	3	123	6	415	117	15,048
4. Ice Cream Cabinets—Complete	1,052	148,570	2	208	137	15,645	1,191	164,423
5. Ice Cream Holding Cab. Only (Remote)	181	23,016	2	189	6	800	189	24,005
6. Bottled Beverage Coolers—Complete	2,852	271,923	1	75	21	1,844	2,874	273,842
7. Milk Cooling Cabinets (No High Sides)	108	6,529	.....	.....	3	125	111	6,654
8. Air Conditioners—Self-Contained	61	10,900	.....	.....	32	7,497	93	18,397
9. Air Conditioners—Floor Type (No High Sides)	129	63,533	.....	.....	7	4,025	136	67,558
10. Air Conditioners—Ceiling (Cooling Only—No High Sides)	139	21,880	.....	.....	23	3,023	162	24,903
11. Air Conditioners—Ceiling Type (Equipped for Heating—No High Sides)	92	48,932	.....	.....	5	2,385	97	51,317
12. Air Conditioners—Residential Type (No High Sides, Boilers, or Furnaces)	.....	.....	.....	.....	4	2,000	4	2,000
13. Condensing Units Less than ⅓ Hp.	2,236	116,873	16	1,064	217	13,711	2,469	131,648
14. Condensing Units—⅓ Hp.	2,264	164,201	23	1,927	443	37,913	2,730	204,041
15. Condensing Units—½ Hp.	1,095	109,832	24	2,649	286	31,089	1,405	143,570
16. Condensing Units—¾ Hp.	761	$ 99,876	13	1,994	83	11,422	857	113,292
17. Condensing Units—1 Hp.	628	97,848	15	2,668	121	19,592	764	120,108
18. Condensing Units—1½ Hp.	277	54,763	8	1,769	61	12,632	346	69,164
19. Condensing Units—2 Hp.	125	28,841	5	1,203	50	11,495	180	41,539
20. Condensing Units—3 Hp.	96	26,820	2	386	36	9,204	134	36,410
21. Condensing Units—5 Hp.	82	35,413	1	424	8	3,251	91	39,088
22. Condensing Units—7½ Hp.	51	32,265	.....	.....	9	5,119	60	37,384
23. Condensing Units—10 Hp.	55	41,370	1	741	7	5,239	63	47,350
24. Condensing Units—15 Hp.	31	28,913	.....	.....	2	1,340	33	30,253
25. Condensing Units—20 Hp.	25	32,299	.....	.....	3	2,940	28	35,239
26. Condensing Units—25 Hp.	18	22,850	.....	.....	.....	.....	18	22,850
27. Total—Lines 13 to 26 Inclusive	7,744	.....	108	.....	1,326	.....	9,178	.....
28. Total—Lines 1, 2, 4, 6, 8, and 27	13,210	.....	113	.....	1,654	.....	14,977	.....
29. Commercial Evaporators (Not reported Above)	2,458	71,171	169	4,913	1,015	31,419	3,642	107,503
30. Air-Conditioning Evaporators (Not Reported Above)	216	61,469	2	120	2	1,870	220	63,459
31. Total Commercial & Air Conditioning	.....	$1,760,503	.....	$20,629	.....	$251,151	.....	$2,032,283



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The practical design and extreme precision of TAG Pocket Thermometers are reflected in the great number of these instruments which are carried by alert servicemen. They are available in mercury or in spirit-filled, with range of —30 to +120°F. Or in mercury in ranges of +30 to +120°F. or 0 to 220°F., 6" in length. Send for prices and a copy of the TAG Control and Test Equipment Catalog No. 1136-25.
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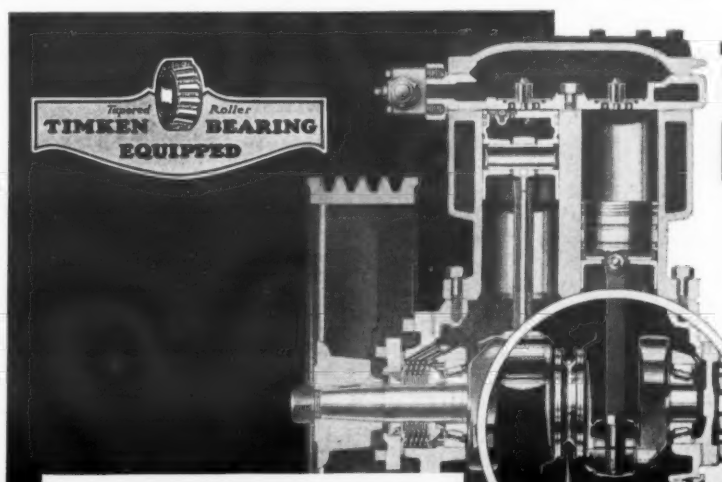

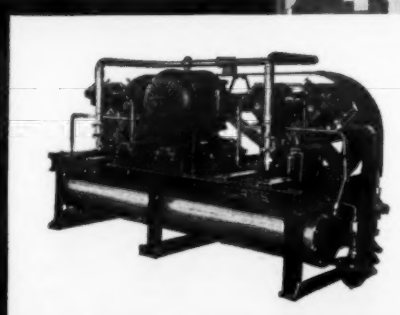

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TIMKEN, TAPERED, ROLLER BEARINGS have been proven by years of use in leading American automobiles. In your CURTIS COMPRESSOR, special, sound-proof type Timken Bearings add to the efficiency, smooth operation and long life. Unlike other types of anti-friction bearings, they provide for easy outside adjustment for wear if necessary.
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— BUYER'S GUIDE —

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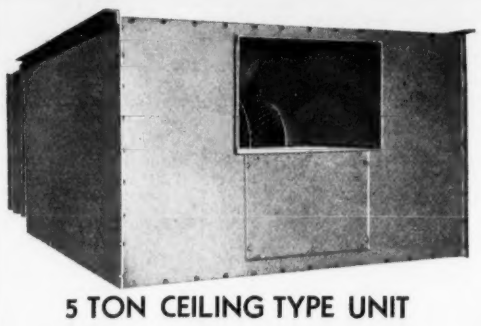

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Completely built up Air Conditioning Units are available in either floor or ceiling type, capacities from one ton to twenty tons. Complete, including motor, blowers, coils, and filter. Complete listing in catalog.

The 1937
PEERLESS AIR CONDITIONING CATALOG

The Peerless Air Conditioning Catalog for 1937 is now ready for distribution. In it is listed the most complete line of air conditioning low sides on the market—from small comfort coolers to large coils for central system installations. It is a book full of valuable sales and engineering information.

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BUY PEERLESS FOR PERFORMANCE

Wagner Markets New Line of Motors

ST. LOUIS—Introduction of a line of annular-type resilient-mounted motors in sizes from ⅛ to 1 hp. marks a new mechanical modification in Wagner Electric Corp.'s line of fractional horsepower motors.

Annular resilient mountings are now available on repulsion-start-induction, split-phase, capacitor, and polyphase types of motors manufactured by the company. Rubber mounting supports which absorb motor vibrations are as close to the shaft center as possible, resulting in less noise and less vibration, the company claims.

Motor base is of cold rolled steel, and is shaped in the form of a cradle for supporting the motor. Large rings of rubber, which support the motor, are vulcanized to inner and outer steel rings, for padded resistance against vibration.

Latches and latch-nuts lock the motor into place in the cradle-arms, and may easily be removed or loosened if the motor is to be removed.

To meet the requirements of manufacturers of refrigerators and small belt-driven appliances, these types of motors are also available with belt-tightener bases. They are so designed that the belt tension increases with the load, preventing belt slippage.

MSA Bulletin Describes New Ammonia Masks

PITTSBURGH—A bulletin describing the new MSA Ammonia masks, and illustrating their use in the servicing of ammonia refrigerating equipment, has been released by Mine Safety Appliances Co.

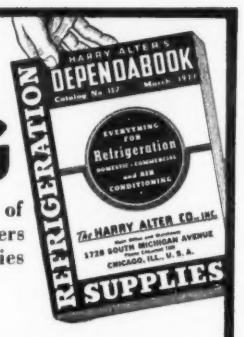
Copies of the bulletin may be obtained from the company.

Automatic Washer Names Four Distributors

NEWTON, Iowa—Four new distributors in three states have been appointed by Automatic Washer Co., manufacturer of Automatic washers and ironers.

The new distributors are: Electric Supply Co., Oakland, Calif.; Sacramento Electric Supply Co., Sacramento, Calif.; Ruch Oil Co., Napoleon, Ohio; H. B. Shank Co., Fort Wayne, Ind.

Get this NEW BARGAIN CATALOG



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AIR CONDITIONING & REFRIGERATION SUPPLIES

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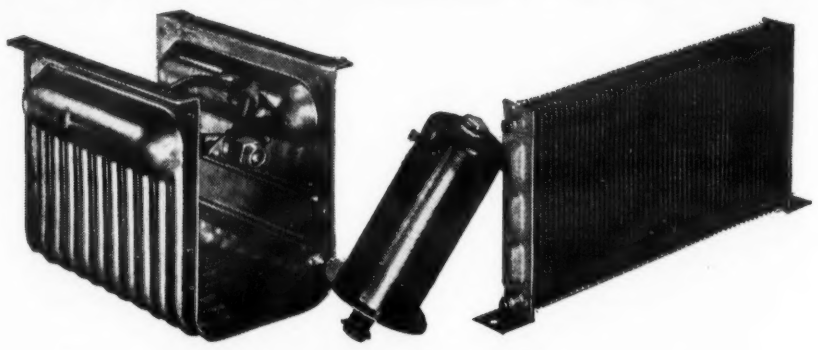
SUPPLYING THE REFRIGERATION INDUSTRY



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REFRIGERATION MEANS TEMPERATURE - AND TEMPERATURE MEANS MARSH

MODERN air conditioning and refrigeration work calls for an exactness of control unknown a few short years ago . . . . and accurate, unfailing thermometers are an important essential of every system.

Marsh dial thermometers have become "the standard of accuracy." They not only *are* accurate, but they *stay* accurate. A recalibration feature permits positive calibration without removing the mechanism from the case.

Try Marsh dial thermometers and you will understand why refrigeration men say "temperature means Marsh."

Marsh dial thermometers are built in several sizes and are available in a wide variety of temperature ranges, either with Fahrenheit or Centigrade scales. Self-contained and distant reading types.

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MARSH *Refrigeration Instruments*

COMMERCIAL REFRIGERATION SERVICE

Design and Construction of Forced Convection Cooling Units

CHAPTER 7—Evaporators & Refrigerant Controls (Cont.)

BY K. M. NEWCUM

Forced Air Cooling Units

A forced-air cooling unit is one through which the circulation of air is "forced" by means of a fan or series of fans. For the purpose of simplifying the term they will henceforth be called "Blower Units."

A typical Kelvinator blower unit is illustrated in Fig. 154. Note that the liquid refrigerant is supplied into the bottom header and that the suction gases are taken out from the top header. Parts numbered "20" are directional louvers.

Note the drier coil immediately behind and surrounding the fan blades. Note the location of the thermostatic bulb. It is attached to the beginning of the drier coil and just a few inches from the end of the evaporator.

A typical Frigidaire blower unit is shown in Fig. 155. The tubing in this evaporator is headered at both the liquid and suction outlets. The liquid is fed into the bottom and the suction gas taken off the top. The unit is fitted with a drier coil much like the Kelvinator shown in Fig. 154.

By comparison with standard gravity type fin coil, the blower unit is much smaller; it has much less actual evaporator surface. More rapid circulation of air and the resulting faster heat transfer bring its refrigerating up to an equal or sometimes greater basis than that of the larger gravity type fin coil.

SUCCESS OF INSTALLATION

Blower units have been used with varying degrees of success in many different applications. One of the first precautions in installing a blower unit is to direct the air so that the blast directly from the unit does not strike the food products. This precaution, of course, is unnecessary when cooling beer kegs or other bottled or packed merchandise.

With a blower unit, circulation is forced to nearly all parts of the refrigerator, and is continuous. Some manufacturers recommend intermittent fan operation, but continuous operation seems more successful.

Higher relative humidity for continuous circulation is claimed. Higher relative humidity is obtained by re-evaporation of the moisture on the coil, using high velocity air passing through it from the fan.

These two features would appear to solve all the problems of circulation and drying out of the product, which are major ones in market refrigeration.

CONTROLLING HUMIDITY

The answer, however, is not as simple as it seems, and blower units have not been found to solve the problem in all cases.

The reason for the failure of the blower units to achieve complete success may be accounted for as follows: even with higher relative humidity, rapid circulation may cause dehydration in some classes of products. This reveals the fact that different products require different humidity conditions.

CLASSES OF PRODUCTS

Frigidaire classifies these several common market products as follows:

Class 1—Eggs, boxed poultry, long-time storage of cheese and products that require high relative humidity for their storage, and from which it is desired to maintain a minimum rate of moisture evaporation during storage. Cold cuts and pork products usually having a high cereal content may be added to this list.

Class 2—Cut meats, such as steaks, chops, etc.; vegetables, beer storage (wooden kegs) rooms, and similar products which are being held for only a limited time, and from whose surfaces the rate of moisture evaporation is high.

Class 3—Carcass of beef, carcass pork and most fruits. These and similar products require moderate relative humidity for their storage, the rate of moisture evaporation from their surfaces may be considered moderate.

Class 4—Chocolates, furs, woolens, canned goods, barreled goods, canned and bottled milk storage rooms, beer storage rooms (steel kegs exclusively), and products that require low humidity (or where relative humidity is of no importance), and from whose surface there is a very low rate of moisture evaporation or none at all.

INSTALLATION RECOMMENDED

For Class 1 products, a temperature differential of from 6° to 8° F. between the refrigerator and refrigerant temperature is recommended. This will result in a very high relative humidity.

For Class 2 products, the suggested temperature differential is 10° to 12° F.

The differential for Class 3 products should range from 12° to 20° F. For Class 4 products the differential should be around 20° F.

This illustrates that while most of the market products come in the second classification of from 10° to 12° F. there may also be products stored in the same refrigerator falling in

(*Concluded on Page 19, Column 1*)

Kelvinator Forced-Air Unit

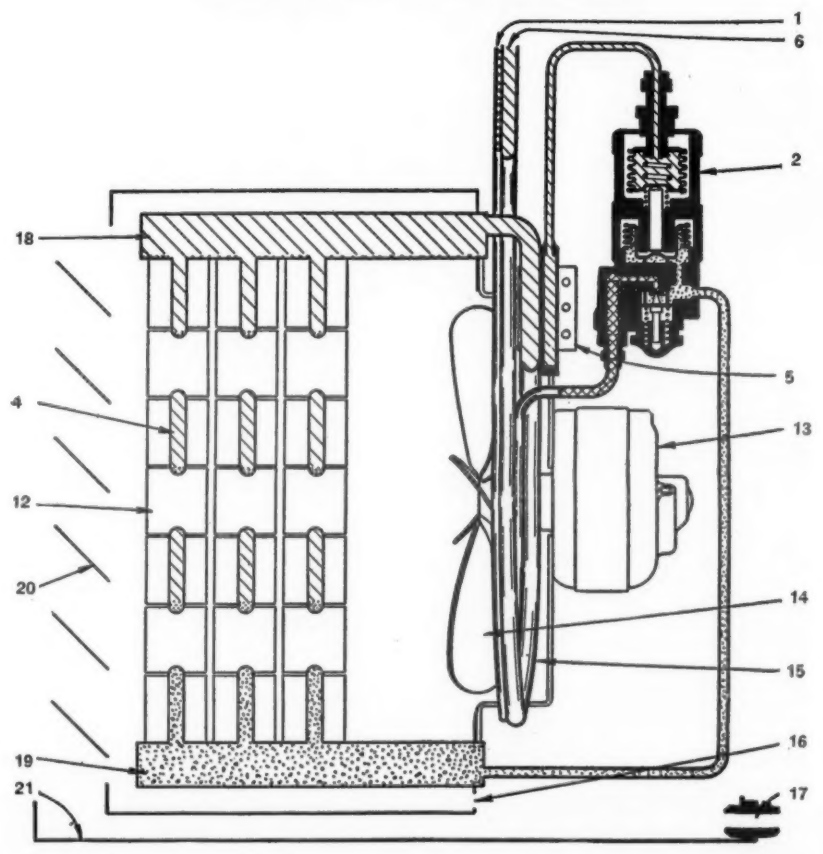

Fig. 154—Cross-sectional view of Kelvinator forced-convection type cooling unit. Key to numbered parts is as follows:

1. Liquid Line Connection
2. Expansion Valve
3. Header Plug
4. Vaporizing Tube
5. Expansion Valve Control Bulb Clamp
6. Suction Line
7. Header
8. Header Liquid Tube
9. Fitting
10. Liquid Service Valve
11. Suction Service Valve
12. Fin
13. Motor
14. Fan
15. Heat Exchanger
16. Water Exit
17. Drain Connection
18. Suction Header
19. Liquid Header
20. Louvre
21. Drip Pan

Northwest Equipment Opens Minneapolis Store

MINNEAPOLIS—Northwest Equipment Co., recently organized local firm, has opened an appliance store at 715 W. Lake St. here. The firm handles G-E refrigerators and other household appliances.

Riley Whitmore, formerly with Harold L. Schaefer, Inc., local manufacturer of commercial refrigeration equipment, heads the new company.

Other officers are: Louis Stacy, assistant store manager; James Kruse, consultant engineer on electric refrigeration and oil heating; James Leaon, general sales director; Waldo Bunger, air-conditioning and oil heating manager; Joseph Quarness, refrigeration service manager.

Harrison Works with Plumbers On Appliance Sales

NEWARK—Philip H. Harrison & Co., General Electric distributor, is cooperating with the Master Plumbers' Association of New Jersey in the sale of G-E dishwashers, disposalls, and hot water heaters.

Sales of 112,787 Vacuum Cleaners Reported in Feb.

CLEVELAND—Sale of 112,787 floor cleaners and 38,477 hand cleaners was reported by the vacuum cleaner industry for February, according to E. Murray, of the secretary's office of Vacuum Cleaners Manufacturers Association.

REA Suggests 1-Cent Electric Rate to Cooperatives

WASHINGTON, D. C.—A wholesale rate of 1 cent a kilowatt-hour or thereabouts has been suggested by Rural Electrification Administration as a reasonable rate for rural cooperatives to pay producing utilities for electrical energy.

"Since the difference of a fraction of a cent per kilowatt-hour in the wholesale rate will sometimes make the difference between a sound and an unsound project, every effort should be made to buy energy for 1 cent per kilowatt-hour or thereabouts," REA says in the current issue of its publication, *Rural Electrification News.*

BUYER'S GUIDE

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"Boy! That's the Kind of NEWS I Like!"

TOSS OUT THE OLD -SLIP IN THE NEW!

TEN MORE EXACT REPLACMENTS!

Ranco has *always* led in EXACT REPLACEMENT THERMOSTATS for Domestic Refrigerators. And now —ten more beauties just added to the line! Is this *real news?* Ask any service man. Write for Bulletin No. 655.

Ranco INC. Columbus, Ohio

COMMERCIAL REFRIGERATION SERVICE

Installation of Forced-Draft Coolers For Maximum Efficiency

(*Concluded from Page 18, Column 5*)

one or more of the other classifications.

In other words, the relative humidity and the rate of circulation in a blower unit is more critical than with a gravity connection coil, so the selection of the unit is important.

It is also a fact that the capacity of a blower unit is very materially decreased with a slight accumulation of frost on the fins and tubes.

For this reason alone the total load which the blower unit and condensing unit must handle under maximum conditions must be accurately estimated. An under-capacity blower may function very satisfactorily during the winter months, but will collect frost during the warmer months and thus cause service problems.

CAPACITY REDUCED

The reason why a blower unit's capacity is so much more materially reduced by a slight accumulation of frost than a conventional coil is simply a matter of the difference in actual fin and tubing surface on the two types.

For example, assume an average fin coil for a certain size cooler to have five times the square feet of fin and tube surface that a blower unit for the same cooler would have. If the fin coil collects ⅛ of an inch of frost and so does the blower unit, the fin coil may still produce approximately five times as much refrigeration as the blower unit; the very principle of the blower unit depends on rapid heat transfer, which cannot take place if the surface is coated with frost.

To guard against this condition the unit should have ample capacity for maximum peak conditions with a compressor-operating time not to exceed 16 hours a day.

RAPID DEFROSTING

It is true that a blower will defrost very rapidly when the compressor shuts down, but if during a peak load condition the compressor operates continuously for several hours the evaporator will coat over with frost. This coating insulates the evaporator, reduces its capacity, and the result is that the compressor continues to operate in an attempt to reduce the box temperature when the evaporator hasn't the capacity to do it.

The above condition is given on an installation using a thermostat to control the refrigerator temperature.

When such a condition exists with a temperature-controlled job and it is not possible to install a larger unit, a combination thermostatic and low-pressure control can be used successfully.

When the above condition exists, that is, the unit frosts up and the compressor continues to operate, the suction pressure drops very rapidly.

PROPER CONTROL

To overcome this condition leave the thermostat "as is" to control the refrigerator temperature; and in addition, install a low-pressure control at the compressor. Check the operating back pressure when, during normal operation, the compressor is about to shut down. Or, what is the same thing, determine the lowest possible operating back pressure at which the compressor can operate without accumulating heavy frost on the blower unit. Set the low-pressure control to cut out at this point. Set it to cut in at a point close to the normal cutting-in pressure.

Purpose of this additional control is to cut the machine out even though the thermostat is still calling for refrigeration when the unit starts to collect frost and consequently runs continuously at very low back pressures.

When the low-pressure control cuts out, the blower unit can defrost. This control will come into play only under extreme conditions. During normal operation the thermostat will operate the system.

This arrangement reduces service calls and makes it unnecessary for the users to shut down or change the thermostat adjustment when frost conditions appear.

It also prevents the very rapid dehydration that results from a fan blowing air over a frosted coil for a long period of time. If the compressor works on comparatively short cycles, the fan reevaporates some of the moisture from the coil when it is defrosting, but if it does not defrost, there is no reevaporation and consequently the relative humidity is greatly reduced.

Frigidaire Unit

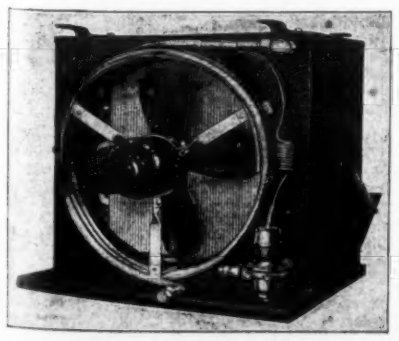


Fig. 155 — Typical Frigidaire blower unit.

Movie Shorts Promote Electric Ranges

INDIANAPOLIS—Movie shorts depicting the economies and advantages of electric range cookery are being shown in 15 theaters throughout this city as part of a promotional campaign being sponsored by the Indianapolis Power & Light Co. to boost dealer range sales and step up domestic current consumption.

The movie shorts are the opening wedge in the utility's city-wide dealer cooperative campaign, which will include the use of radio, newspaper, direct mail, and outdoor advertising.

Commercial tie-ins in the movie films announce that dealers offer trade-in allowances, free installation, low monthly payments, and expert service to electric range buyers.

Dramatizing the cleanliness of electric cookery, the film shows a housewife wiping a pan which she had just used on the electric range, with a white silk dress—without leaving a mark on the dress.

In placing its theater advertising, the utility chose theaters according to their drawing power among families unfamiliar with the benefits of electric range cookery. Second determining factor was their location in regard to cooperating dealers' stores.

New Jersey Utility's Gas Appliance Sales Up 32%

NEWARK—Gas appliance sales of Public Service Corp. of New Jersey and subsidiary companies during the past year were 32.21% above those of 1935, the company reports.

Gas refrigerator sales for 1936 again set a company record, reaching a new high of 6,027 units. Gas range sales numbered 17,834, or 1,173 units above the 1935 mark. Progress in the development of gas water heating was indicated by sale of 6,775 automatic gas water heaters in 1936, compared with 1,860 sales during 1935.

Cone Employes Plan & Build Modern New Quarters

BENNINGTON, Vt.—Besides providing attractive, modern facilities for its business, the new two-story brick building which houses the Cone Home Equipment Co., General Electric dealership here, is proof also of the versatility of the firm's personnel.

Plans for the building, which is of brick and steel construction, were drawn up by Mr. Cone, who employed no outside contractors. Most of the construction work was done by employes of the dealership.

With only the first floor finished for occupancy at present, the space is divided to provide a display room extending the full length of the building, 90 by 31 feet. The showroom contains a completely equipped all-electric kitchen.

Directly in back of the showroom, offices and a radio repair room are located, and a storage room, 50 by 31 feet in size, takes up the rear section.

Separate heating plants are installed for the front and rear sections of the building. Front section of the first floor is to be air conditioned by a G-E oil furnace and humidifying apparatus, which will be placed in the showroom for demonstration purposes.

McDonald Range Salesmen Learning to Cook

OMAHA—Dealers and salesmen in the A. Y. McDonald Co. organization, Norge distributor, have turned cooks —and what's more, they have to eat their own cooking.

A series of Thursday morning meetings, over a three-months period, are being held in Nebraska Power & Light Co.'s all-electric kitchen. The men meet in groups of eight at 9 a.m., and spend the morning learning the rudiments of electric cookery under the direction of Miss Ward, of Nebraska Power & Light, and Miss Eleanor King, McDonald's economist.

All the men present actually participate in the preparation of food, which is served to them at noon.

The idea, says Mr. McDonald, is not to make cooks out of the men, but rather to give them a working knowledge of electric cookery. Salesmen and dealers who use an electric range, he believes, will be equipped to make a practical demonstration of the equipment.

New G-E Distributor Opens Remodeled Salesroom

CAYUHOGA FALLS, Ohio—R. C. Rasp and G. A. Ronacker, recently appointed distributors for General Electric Co., have opened a remodeled sales room at 2164 Front St.

NEW KOCH ECON-O-CASE

HUMIDITY AND TEMPERATURE IN PERFECT BALANCE

WELDED ALL-STEEL CONSTRUCTION

CORKBOARD INSULATION

TRIPLE GLAZING

THE PRICE LEADER OF A BIG LINE

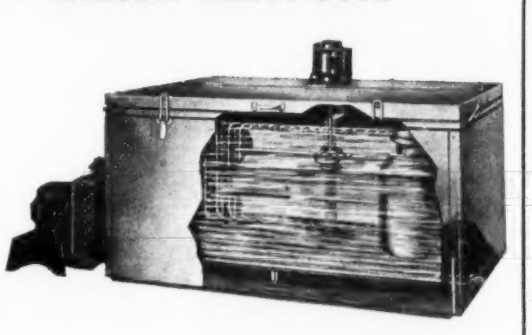
DISTRIBUTORS WILL BE INTERESTED

WRITE TODAY KOCH REFRIGERATORS NORTH KANSAS CITY, MO.

EXPORT DEPT. 304 E. 45TH ST. N. Y. CITY

Modern Dairy Farmers Want Modern Equipment

Sell them the WILSON VERTI-COIL



THE Wilson Verti-Coil Cooler revolutionizes milk cooling; gives dealers a sales story that measures up to modern dairy demands. The Verti-Coil gives greater cooling surface, induces natural circulation of water, provides more room for cans, assures rapid and uniform cooling. This patented coil can be used with any compressor unit at a cost of but a few cents per day. Cools milk to below 50° in less than an hour—meeting any milk temperature requirement. It pays to sell a milk cooler line that solves the modern dairyman's problems. Write for dealer proposition today.

WILSON CABINET CORP.

114 MAIN ST. SMYRNA, DEL.

Dayton V-Belts are the logical choice for all types of appliances, because they provide silent, dependable transmission—because their powerful grip prevents slippage—because they run smoothly without weaving, twisting or vibrating. A nearby distributor carries a complete stock.

THE DAYTON RUBBER MANUFACTURING CO. DAYTON, OHIO

WORLD'S LARGEST MANUFACTURER OF V-BELTS

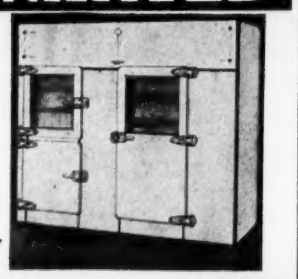
Dayton V-BELTS

BUYER'S GUIDE

SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE REFRIGERATION AND AIR CONDITIONING INDUSTRIES

DISTRIBUTORS WANTED

Percival equipment meets every requirement of the modern food store.



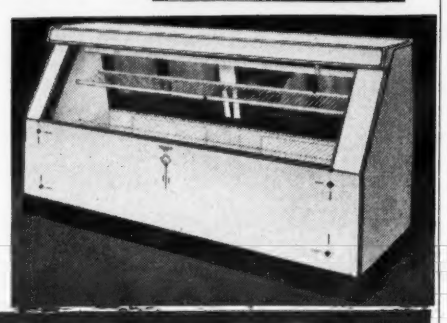
For mechanical refrigeration only

Percival's complete line will increase your sales of electrical refrigeration equipment and offer added earnings.

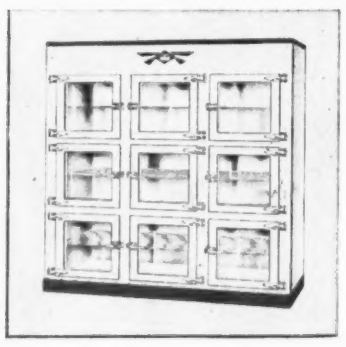
Desirable territories still available. Write for complete information.

1886-1937

51 years of service to meat markets.



C. L. PERCIVAL CO.
DES MOINES, IOWA



REACH-IN BOXES for GROCERIES . . . . RESTAURANTS . . . INSTITUTIONS

Available in two lengths and any desired door arrangement, either glazed or solid, using three standard door sizes. Another of the profit-making items in the extensive Sherer line.

Addition of the Sherer Case and Cooler Franchise to your present line is *your* move for '37. Desirable territories still available. Write us for details.

SHERER
DISPLAY AND STORAGE EQUIPMENT FOR RETAIL FOOD STORES
SHERER-GILLETT CO.
MARSHALL, MICHIGAN

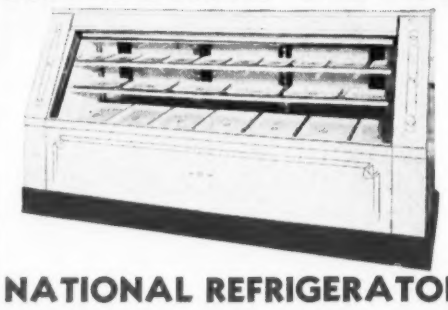
TYLER'S WELDED STEEL Cases

● 1937 line offers wide variety and sensational values. 6 big new features and iron-clad guarantee. Only Tyler gives one-piece "welded steel" construction, 100% insulation. Wonderful sales opportunity. Most talked of and fastest selling line on market. WRITE today.

TYLER Sales-Fixture COMPANY
Dept. E, NILES, MICHIGAN

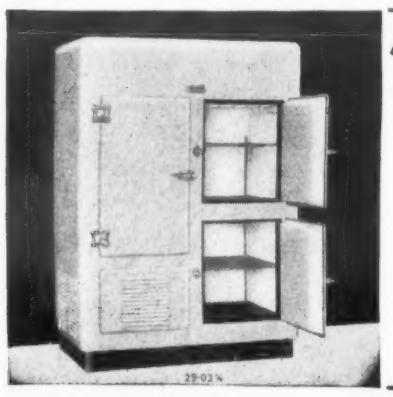
SIX BIG NEW FEATURES

NATIONAL DOUBLE DUTY CASES



Built extra heavy, lasting many years longer than other makes. 3" to 4" cork insulation, 5" to 6" walls, porcelain inside and outside, triple plate glass front, triple glass rubber sliding doors, chromium hardware, all material highest grade, with or without coils or platters, two or three shelves, prices low, dealers wanted, few territories open. For more information write

NATIONAL REFRIGERATOR CO., Philadelphia, Pa.



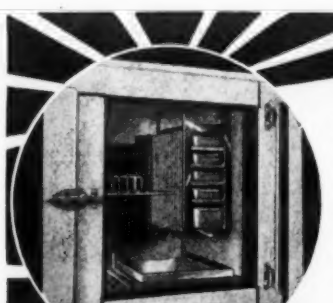
STREAMLINED Beauty

THIS LINE SELLS ON SIGHT

Weber brings the result of 35 years of successful manufacturing experience . America's most beautiful line of Refrigerator Cases and Commercial Cabinets. Exclusive territories now open — Complete financing plan

Established 1902 *Cable Address "Weberco."*

WEBER SHOWCASE & FIXTURE CO., INC.
5700 Avalon Boulevard Los Angeles



Make Your Own Ice Cubes

in either the 330 or 650 Refrigerators, through the addition of the new ICE CUBE MAKER. Used as an accessory, but combined with the standard back wall coil, assures uniformity of temperature and humidity in food and beverage compartments. NO MATTER HOW HEAVILY FROSTED THE ICE MAKER BECOMES, YOU ARE GUARANTEED PERFECT EFFICIENCY AND UNIFORM REFRIGERATION.

Made in 2 sizes—126 large cubes (14.4 lbs. of ice) and 126 small cubes (7.64 lbs. of ice)

Write for Illustrated Folder

GLOEKLER MANUFACTURING COMPANY
429 Fourth Avenue • Pittsburgh, Pa.

Carrier Describes Problems In Conditioning of Mine

BOSTON—Installation problems of the United States' first mechanically refrigerated mine air-conditioning system, to be installed at 3,400 and 3,600-ft. levels of the Magma copper mine at Superior, Ariz., were described by Willis H. Carrier, chairman of Carrier Corp., before a recent joint meeting of 400 members of the Air Conditioning Bureau, American Metallurgical Society, and several other New England engineering groups.

High temperatures in mines are caused by heat which rises from lower portions of the earth, Mr. Carrier said, and this heat consequently becomes more intense at lower levels. The air-conditioning system will cool and reduce the humidity of the mine at all seasons, and will also cool new portions of the mine before they are worked, he stated.

Julius Daniels, president of the Air Conditioning Bureau, presided at the meeting. Other speakers included: Davis S. Boyden, president, American Society of Heating and Ventilating Engineers; J. F. G. Miller, president, Air Conditioning Manufacturers Association; and H. H. Mather, Philadelphia Electric Co.

Helburn Features Expansion In Full-Page Spreads

MONTGOMERY, Ala.—Helburn Co., distributor of Frigidaire air-conditioning and commercial refrigeration equipment, accompanied its recent expansion and line-addition program with full-page advertisements in local newspapers. These ads featured photographs of recent installations.

Sam Helburn, son of the organization's founder, and Fred Kern are proprietors of the business. Paul Renand is air-conditioning engineer.

Norge Air Conditioning Dealer Opens in Portland, Ore.

PORTLAND, Ore. — The Portland Norge Heating Stores, Inc., recently opened for business on the ground floor of the Rothchild Bldg., handling the Norge heating, air-conditioning, and appliance lines. Leslie E. Swan is manager.

Three Portland merchants have combined to form the new company. They are: A. L. Morris, head of Mueller Furnace Sales Co.; Sidney S. Day, heating and air-conditioning contractor; and E. E. Carroll of the Kleen-Air Furnace Co.

Air Conditioning MADE EASY

Presented below is the conclusion of Section 10 "Dont's" of AIR CONDITIONING MADE EASY, by F. O. Jordan, air-conditioning editor of the NEWS, and former assistant chief engineer of Airtemp, Inc.

The following instalments of the manual have appeared in the NEWS:

What is Air Conditioning?—Sept. 23.

Section 1, Introduction, and Section 2, Definitions and Simple Thermodynamics—Sept. 30.

Section 3, Coil Performance—Oct. 7 and 14.

Section 3A, Water Cooler Performance—Oct. 14.

Section 4, Condensing Unit Performance—Oct. 21.

Section 5, Air Movement and Ventilation Requirements—Oct. 28.

Section 6, The Complete Air-Conditioning System for the Cooling Season—Nov. 4, 11, 18, and 25.

Section 7, Heating—Dec. 2, 9, 16, 23, 30, Jan. 6, 13, 20, 27, Feb. 3, 10, 17, 24, March 3, and 10.

Section No. 10, Don'ts—March 17 and 24.

— AIR CONDITIONING MADE EASY —

Controls & Zoning Commonly Used in Summer Air Conditioning

SECTION NO. 14

CONTROLS & ZONING

BY F. O. JORDAN

Purpose of this section is to discuss controls and zoning, commonly used in connection with summer air conditioning. Controls and zoning commonly used in heating service are described in Section No. 7.

Generally, controls used in summer comfort air conditioning are either for maintaining comfort, or for safety. Automatic controls may be for control of temperature, humidity, or pressure. Temperature controls are known as "Thermostats." Humidity controls are known as "Humidistats," while pressure controls are known as "pressurestats."

Thermostats and humidistats which are to prevent *fall* of temperature or humidity respectively (winter application) must "make" contact and so place in operation the equipment which they control, upon falling temperatures or humidities, while thermostats or humidistats which are used to limit the *rise* (summer application) of temperature or humidity respectively must "make" contact upon rising temperatures or humidities. Similarly, pressurestats, which are for the purpose of preventing rise of pressure, must "make" contact upon rising pressures, and vice-versa.

Thermostats and humidistats now available may be set either for summer or winter operation, so that the same instrument may be used for both services.

Types of Instruments

The general types of thermostats, humidistats, and pressurestats are described in Section No. 7.

Summer Comfort Control

Comfort Conditions:

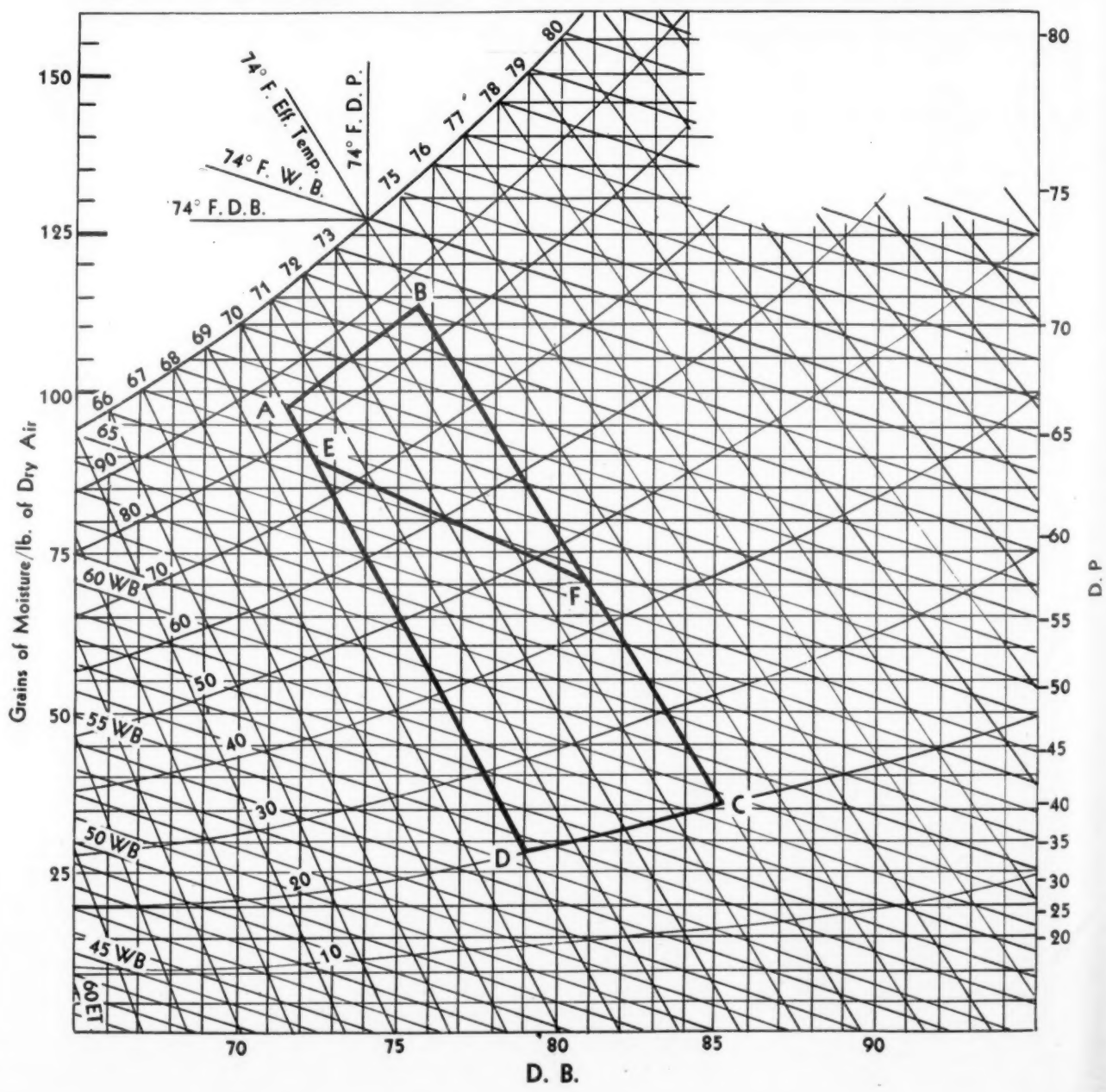
Since the ideal atmospheric conditions necessary for comfort do not usually exist of their own free will, and since the well being and efficiency not only of the human body, but also of the human mind and soul depend to a considerable extent upon bodily comfort, the control of comfort is a function of considerable importance.

First step in achieving atmospheric conditions conducive to comfort is to control temperature, with control of humidity being not far behind in importance. Other factors apply also, but generally to a lesser degree. Atmospheric temperature must be held at a level far enough below the body temperature that the rate of heat transfer from body to atmosphere does not permit body temperature to increase to an uncomfortable point.

However, the temperature level of the atmosphere must not be held at a level which is too low, for under such a condition the high rate of heat loss from the body to the atmosphere would result in a sense of bodily cold. Although the temperature of the atmosphere must be held within rather narrow limits, the ideal

(*Concluded on Page 21, Column 1*)

Fig. 70—Psychrometric Chart for Determining Effective Temperatures



Figuring Effective Temperatures; Basic Operation of Controls

(Concluded from Page 20, Column 5)

inside temperature for comfort does not always remain at the same level, as the inside comfort temperature is higher on very warm days than on milder days.

Generally, a satisfactory condition during hot summer weather is for the inside temperature to be 15° lower than the outside temperature, although the ideal temperature differential increases somewhat as the outside temperature approaches closely to or exceeds 100° F., while a lesser differential is preferable for mild outside temperatures. During the heating season, approximately 70° F. is the generally accepted inside dry-bulb temperature.

Comfort demands also that humidity be confined within definite, but much wider limits. If humidity is too low, the rate of evaporation of perspiration from the skin becomes so rapid that a sense of undue coolness results; if the humidity is too high, the rate of evaporation of perspiration is retarded until a hot clammy feeling is produced.

The room humidity level which is necessary for comfort depends largely upon the room dry-bulb temperature, lower humidities being necessary for a given degree of comfort (or a given "effective temperature") at higher room temperatures, and higher humidities being required to produce a given degree of comfort at lower room temperatures.

Thus "effective temperature" or constant comfort lines run diagonally across the psychrometric chart (see Fig. 70) from regions of higher temperature and lower humidity to regions of lower temperature and higher humidity.

The ideal control is one which maintains a constant comfort condition, rather than a constant temperature and/or humidity, because such a control may be set to allow higher room dry-bulb temperatures during very hot outside conditions, yet it will maintain an inside condition of constant comfort by holding the room humidity at a lower level during the period of higher dry-bulb temperature.

During conditions of mild outside dry-bulb temperature, this type of control may be set to hold lower inside dry-bulb room temperatures, but again will maintain constant comfort by allowing a higher room humidity. The inside conditions maintained by this type of control are desirable because higher inside temperatures coincidental with higher outside temperatures reduce the sense of shock (a common cause for complaint) when passing to or from the conditioned space.

Another reason is that the reduced temperature differential between outside and inside conditions tends to lower operating costs by reducing the load upon the equipment, while lower inside temperatures are necessary for comfort during mild outside temperature conditions.

However, many systems of control now in use attempt to maintain a constant temperature level, or a constant temperature and humidity level, regardless of effective temperatures and outside conditions.

Because the air-conditioning coil cannot perform in the role of a dehumidifier without doing cooling also, and generally is not used for cooling without dehumidifying, the cooling and dehumidifying functions are so closely interrelated that the control of one involves the other.

Necessity for and Basic Operation of Controls

On a project in which the sensible and latent loads are practically constant for long and regular periods there is no necessity for control. The equipment may be placed in or out of operation as required, by an attendant. Air-conditioning equipment possesses a large measure of inherent controlling propensities, particularly if the cooling and dehumidifying coil and its refrigerant temperature and face air velocity are properly selected to suit the particular load conditions with which they are to be used.

For example, suppose that an increased cooling load is imposed upon the conditioned space, causing a rise in room dry-bulb temperature. This rise in room dry-bulb temperature tends to curtail the increase in cooling load because it curtails the increase in temperature differential between the outside and inside conditions, and more important, it results in a rise in the cooling capacity of the unit because it raises the temperature differential between the coil and the air entering the coil. (See Section No. 3)

For this reason, the rise in inside temperature due to an increase in cooling load is soon checked, and the equipment operates at a slightly higher temperature level at which the greater cooling capacity, due to the rise in inside temperature, balances the increased cooling load. The converse of the the above action also is true, for the drop in room temperature due to a decreased cooling load is restrained by the reduction in cooling capacity of the unit which accompanies a reduction in room temperature.

HUMIDITY RISE

The same things are true of inherent humidity control. Rise in room humidity caused by an increase in latent load tends to curtail the increase in latent load and more important, it results in a rise in the latent capacity of the coil (see Section No. 3), so that the rise in room humidity caused by an increased latent load is restrained.

Hence the equipment operates at a slightly higher humidity level at which the greater latent capacity, due to the rise in inside humidity, balances the increased latent load. The converse of this action also is true, for the drop in room humidity due to the decreased latent load is restrained by the reduced latent capacity which accompanies a reduction in room humidity.

Because of these inherent balancing characteristics, a coil of the proper size selected at the proper refrigerant temperature and face air velocity will hold the inside temperature and humidity within fairly narrow limits throughout a considerable range of load conditions with no control whatever other than its own self-limiting characteristics.

Another factor which helps considerably is the storage or "flywheel" effect of building construction as applied to both temperature and humidty. It is very important to note that at higher outside conditions, somewhat higher inside conditions will be maintained, while lower inside conditions will be maintained with lower outside conditions. As stated above, this is as it should be when comfort is at stake.

However, upon most projects the load variations are such that there is a need for some form of automatic control, especially for temperature control. The usual arrangement is to operate the equipment under the control of a room thermostat, so that the equipment will be thrown out of operation by a slight fall in room temperature, resulting from a decrease in sensible load. With this method of control, the room temperature can be held at a level which will prove quite satisfactory.

VARY DIFFERENTLY

However, it is unfortunate that the sensible and latent loads rarely vary together. Upon certain projects of considerable sensible load variation coincidental with heavy latent load, this fact may necessitate some method of controlling humidity.

For example, suppose that a cooling and dehumidifying coil has been so selected that its cooling and dehumidifying capacities are exactly equal to the *maximum* cooling and dehumidifying loads, respectively, of a given project, and suppose that the equipment is operated under thermostatic control.

When both the cooling and dehumidifying loads are at or near maximum, the equipment operates at practically full running time, so that both room temperature and room humidity are maintained at the desired level.

When both the cooling and the dehumidifying loads are decreased by about the same proportion, or when the latent load is decreased by a greater proportion than the cooling load (as is the case when occupancy is below maximum), the equipment operates only a portion of the time because of the thermostatic action as affected by the reduced cooling load, and neither temperature nor humidity are allowed to rise above the desired level.

However, conditions frequently exist on some projects when the cooling load is considerably below maximum because the outside temperature is not high or the sun is not shining, while at the same time the latent load is at or near maximum because the occupancy and latent ventilating loads are at or near maximum. Under such conditions of reduced cooling load coincidental with heavy latent load, the equipment will be held inoperative by thermostatic action during a portion of the time.

HEAVY LATENT LOAD

During such off-cycles, when the equipment can do no latent work, the humidity level will rise due to the heavy latent load, and the running time will be insufficient to allow the humidity to be brought back to the desired level, even though the latent capacity of the equipment during running time has been increased by the rise in humidity.

Actually the humidity level will be allowed to balance at higher level where the instantaneous latent capacity has been increased sufficiently to offset the decrease in running time. The greater the reduction in sensible load, the greater will be this rise in humidity level, so that eventually a degree of reduction in cooling load is reached where the humidity level will be allowed to rise above the comfort level.

In the case of projects in which possible cooling load reduction (coincidental with heavy latent load) is small, there may be no time when the humidity level will be allowed to rise to an uncomfortable degree.

Such projects are those with heavy occupancy and relatively light transmission and sun loads. On these there can be no great decrease in cooling load while the occupancy (hence latent load) is heavy, because the bulk of the cooling load is due to the occupancy itself.

When the cooling load is reduced because fewer people are in the home, the decrease in running time does not result in a rise of humidity level because there is an attendant reduction of latent load.

SHORT RUNNING TIME

However, in the case of projects in which the possible cooling load reduction (coincidental with heavy latent load) is great, there may be times when the running time will be so short, due to thermostatic action, that the humidity level may be allowed to rise above the range of comfort.

Such projects are those of lighter occupancy and heavy transmission and sun loads, for upon such projects there may be a great decrease of cooling load due to the absence of the transmission and sun loads while the occupancy (hence latent load) is at maximum. There is a limiting feature in the case of such projects in that the latent load is not relatively great, while the relative moisture-absorbing capacity of the building construction usually is high, so that any rise in the humidity level of the room is greatly retarded.

Nevertheless, the fact remains that the project of lighter occupancy with relatively heavy sun and transmission load is more badly in need of humidity control than the space of heavy occupancy with relatively lighter sun and transmission load. Of course, this is contrary to current opinion upon this point.

An important point to remember in considering humidity controls is that the function of such controls is *not* to prevent rise in humidity due to increase in latent load, for there can be no increase in latent load above maximum, or else we must search for a new definition of the adjective "maximum."

Granted that the equipment has been properly selected for maximum sensible and latent loads, as it should be, a rise in room humidity can result, not from an *increase* in latent load, but only from reduced running time produced by a *decrease* in sensible load, if such decrease occurs at a time when the latent load is heavy.

For this reason the purpose of the automatic control is to increase the running time during light sensible load periods in order to accomplish the necessary latent work necessary to prevent an undesirable rise in room humidity, without overcooling the conditioned space during such reduced sensible load periods. This result can be obtained only by reducing the sensible capacity, without reduction in latent capacity as the sensible load is reduced.

TEMPRITE
INSTANTANEOUS
BEER and WATER COOLERS
Detroit Michigan

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SPECIAL RATES APPLY TO THESE COLUMNS ONLY
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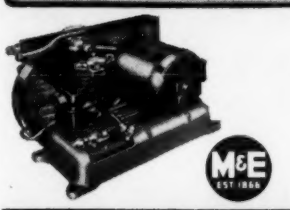
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The Most Complete Line of Ice Cream Cabinets in the Industry
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With or without compressors. Will operate using either Freon, Methyl Chloride or Sulphur Dioxide
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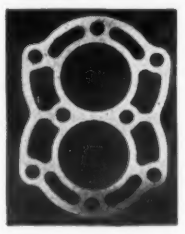
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offer you Metallic Gaskets that hold regardless of what your refrigerant may be and will not shed particles of material to clog up important working parts in a machine. A metal that will not "creep." Once tight it will stay "tight."
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NEW, stronger, specially reinforced charging lines that protect against leakage and breakage and offer a new high standard of safety. Made with seamless bronze corrugated core which completely prevents gas from coming into contact with the covering. Oilproof textile braiding outside. Bronze couplings are soldered to the bronze core, making an integral joint. Special spring-wire reinforcing at ends prevents excessive bending at points subjected to greatest strain. Lines are furnished with swivel end connections or with copper tubing extensions.
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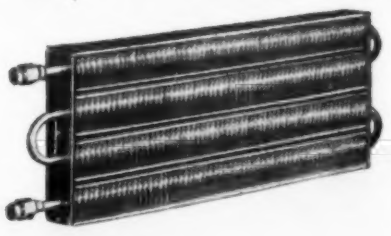
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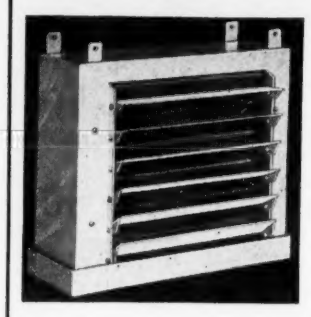

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QUALITY-BUILT
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Sizes range ⅛ to ¾ HP.

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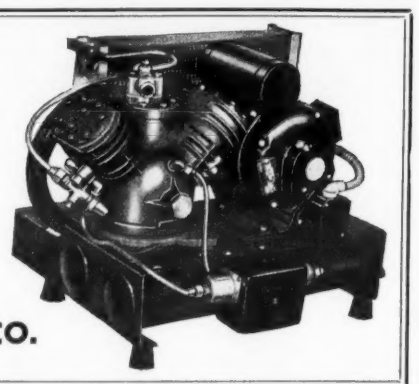

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BARE COMPRESSORS

DIRECT DRIVE CONDENSING UNIT ⅛ H.P. with exceptional capacity for household refrigerators. Particularly recommended for replacement of obsolete hermetic units.

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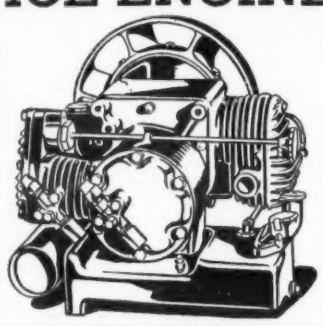

Engine and Compressor one balanced Unit designed and built by the largest manufacturers of Gasoline Engines in the World.

Compressor, 2¼ x 1½ is driven at 625 RPM, one-half Engine Speed, and is oiled for life. Engine displacement—8.95 cu. in. Compressor—5.96.

Ideal for grocery and delicatessen Cabinets, medium size display and Freezer Cases, Ice Cream Cabinets, Soda Fountains, Milk Coolers; Multiples of domestic Cabinets or small commercial Units.

Price reasonably low, liberal dealer discount.

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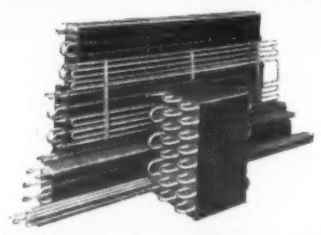

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WATER COOLERS

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From 2 gals. per hour to 500 gals. per minute
WATER FILTERS — STEEL PIPE COILS — SURGE TANKS
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DELIVER YOUR REFRIGERATORS ON RUBBER
***The* DAYTON CARRIER TRUCK**
Will not mar — Speeds delivery

Type X - 53" long — Type Y - 70" long, both with 8 inch rubber tired wheels. Fitted with movable foot or with permanent wide foot for skirted bottom cabinets.

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Armstrong Establishes New Offices for Bldg. Materials Divison

LANCASTER, Pa. — Establishment of a number of new district and branch offices of the building materials division of the Armstrong Cork Products Co. has been announced by H. R. Peck, general manager of the division. Several personnel changes also were announced.

New district offices have been opened in Washington, D. C., Los Angeles, and San Francisco. E. S. Graybill has been appointed district manager of the new Washington office, with James R. Tencher as his assistant. C. B. Sauer, formerly manager of Armstrong's Des Moines office, has been appointed Los Angeles district manager. He will be assisted by George S. Griffith. F. K. Pinney will serve as district manager of the San Francisco office, with John W. Harvey as assistant.

The new district offices will handle the sale of fibreboard insulation, tile floors, acoustical materials, and contract selling jobs on linoleum. John R. Livezey will continue to serve as distributor in the Washington territory for Armstrong's cork insulation, and the Van Fleet-Freear Co. will remain as distributor in the Los Angeles and San Francisco territories.

New branch offices of the division have been established, or will be opened within the next few weeks, at Seattle, Denver, and New Orleans.

Richard S. Near, formerly of the New York office, has been appointed resident salesman for the Seattle branch office. The Asbestos Supply Co. will continue as distributor for Armstrong's cork insulation in the Seattle and northwest territory.

Frederick E. Sullaway, Jr., at present assigned to the company's Cincinnati office, will become resident salesman for the new Denver branch, with the Stearns-Roger Co. continuing as distributor for cork insulation in the territory.

H. C. Porter, formerly a resident salesman in Pensacola, Fla., is serving as manager of the new branch office at New Orleans. H. T. Steffee will continue to serve as distributor.

H. F. Smith, formerly of the Chicago office, has been appointed branch manager of the company's office at Des Moines. J. L. Whiteman, fibreboard specialist in the Chicago office, has been made a general line salesman and will cover Mr. Smith's former territory. James V. Jones, who has just completed his training course in Lancaster, has been assigned to the Chicago office to replace Mr. Whiteman.

R. M. Allard has been appointed manager of the New York district office of the building materials division, succeeding W. M. Whitten, who retired on Jan. 1.

Additional assignments of salesmen who have completed the Armstrong training course were announced as follows: J. Joseph Nilan, Boston office; Gerald E. McCarthy, Dallas office; Edwin H. Gill, Minneapolis office; Franklin W. Stone, Cincinnati office; Louie D. Wall, Jr., and Jacob E. Snyder, Atlanta office.

W. F. Dunnick, for a number of years inside salesman for the Cincinnati office, will be assigned to one of the Cincinnati sales territories.

Dixon Appliance Co. Takes on Westinghouse & S-W Lines

MIAMI, Fla.—George L. Dixon Appliance Co., newly organized appliance dealership here, has been appointed dealer for Westinghouse electric ranges, water heaters, washing machines, ironers, and for Stewart-Warner refrigerators and radios, according to E. W. Bennett, manager.

The new store is headed by George L. Dixon, who is also president of George L. Dixon Co., longtime wholesaler of equipment for restaurants and hotel dining rooms and kitchens. The appliance store will be conducted independently of the company's wholesale activities, Mr. Dixon stated.

- PATENTS -

Issued March 2, 1937

2,072,096. COOLING TOWER. Daniel J. Collins and Kenneth V. Wright, Kansas City, Kan., assignors, by direct and mesne assignments, to The Bahnson Co., Winston-Salem, N. C. Application Oct. 19, 1932, Serial No. 638,592. 15 Claims. (Cl. 261—111)

2,072,144. ABSORPTION REFRIGERATING SYSTEM. Hugo M. Ulistrand, Evansville, Ind., and Harry K. Bergholm, Larchmont, N. Y., assignors, by mesne assignments, to Servel, Inc., Dover, Del. Application April 5, 1933, Serial No. 664,462. Renewed Aug. 4, 1934. 18 Claims. (Cl. 62—119.5)

2,072,187. REFRIGERATING APPARATUS. Carl A. Stickel, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp. Application June 30, 1933, Serial No. 678,449. 12 Claims. (Cl. 62—4)

2,072,300. SLIDING DOOR SEAL FOR REFRIGERATING APPARATUS. Albert L. Goetzmann, Minneapolis, Minn., assignor to Puffer-Hubbard Mfg. Co., Minneapolis, Minn. Application Nov. 25, 1935, Serial No. 51,487. 10 Claims. (Cl. 20—19)

2,072,347. REFRIGERATOR. George L. Strebler, St. Louis, Mo., assignor to Eagle Foundry Co. Original application Nov. 8, 1933, Serial No. 697,095. Divided and this application Dec. 28, 1936, Serial No. 117,924. 8 Claims. (Cl. 62—4)

2,072,414. REFRIGERATING APPARATUS. Daniel D. Wile, Detroit, Mich., assignor to Detroit Lubricator Co., Detroit, Mich. Application Feb. 17, 1933, Serial No. 657,169. 8 Claims. (Cl. 62—101)

2,072,423. REFRIGERATING APPARATUS. Earnest J. Dillman, Detroit, Mich., assignor to Detroit Lubricator Co., Detroit, Mich. Original application June 17, 1930, Serial No. 461,669. Divided and this application July 30, 1934, Serial No. 737,526. 22 Claims. (Cl. 62—5)

2,072,424. REFRIGERATING APPARATUS. Lewis W. Eggleston, Detroit, Mich., assignor to Detroit Lubricator Co., Detroit, Mich. Application Feb. 17, 1933, Serial No. 657,168. 15 Claims. (Cl. 62—101)

2,072,440. REFRIGERATION APPARATUS. Gregg F. Forsthoefel, Springfield, Mass., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Application Feb. 23, 1934, Serial No. 712,490. 2 Claims. (Cl. 62—89)

2,072,486. REFRIGERATING APPARATUS. Harry F. Smith, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio. Application Dec. 24, 1934, Serial No. 758,872. 15 Claims. (Cl. 62—6)

2,072,548. AIR CLEANER. Frank A. Donaldson, Minneapolis, Minn. Application Dec. 17, 1934, Serial No. 757,827. 4 Claims. (Cl. 183—15)

2,072,567. REFRIGERATOR. Thomas I. Potter, Buffalo, N. Y. Application Feb. 14, 1934, Serial No. 711,156. 17 Claims. (Cl. 62—116)

2,072,601. ICE TRAY. James H. Miner, Meridian, Miss. Application March 14, 1936, Serial No. 68,929. 17 Claims. (Cl. 62—108.5)

2,072,617. STOP MECHANISM FOR BELLOWS DEVICES. Paul E. Cate, Knoxville, Tenn., assignor to The Fulton Sylphon Co., Knoxville, Tenn. Application Sept. 25, 1933, Serial No. 690,965. 2 Claims. (Cl. 297—8)

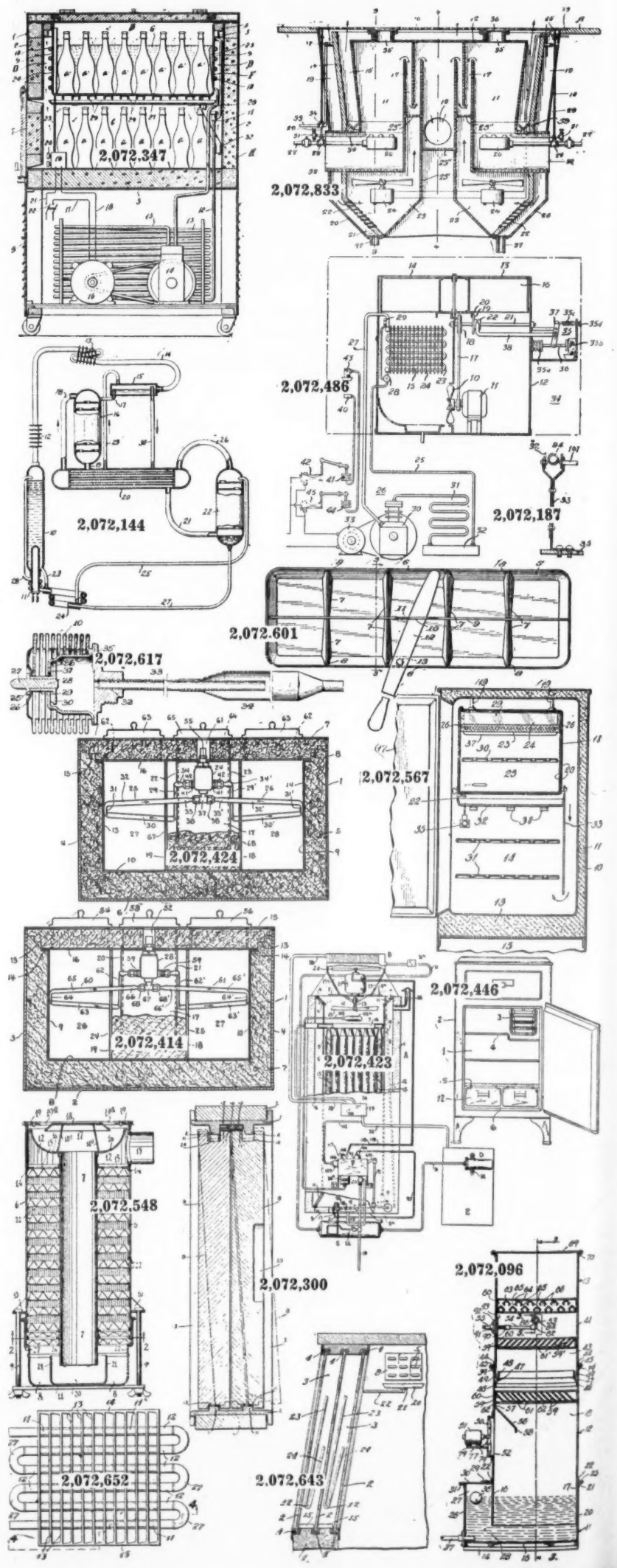
2,072,643. DEHUMIDIFIER. Charles B. Mays, Miami, Fla., assignor, by mesne assignments, to Charles B. Mays, Miami, Fla., as trustee. Application May 12, 1934, Serial No. 725,242. 3 Claims. (Cl. 62—89.5)

2,072,652. HEAT TRANSFER APPARATUS. Jerold H. Shafner, Euclid Village, Ohio, assignor to The National Bronze & Aluminum Foundry Co., Cleveland, Ohio. Application Dec. 28, 1931, Serial No. 583,430. 2 Claims. (Cl. 257—255)

2,072,833. COMBINATION HEATING AND COOLING UNIT. Frederick S. Baird and Carl H. Marsh, Ada, Okla. Application Feb. 10, 1936, Serial No. 63,223. 3 Claims. (Cl. 126—116)

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.



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RATES: Fifty words or less, one insertion, $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning and Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

EXCEPTIONAL OPPORTUNITY for four men as district sales representatives with nationally known coil manufacturer. Consideration will be given men with experience in contacting jobbers and distributors of electric refrigeration. We have openings for capable men who know the commercial business thoroughly. Must be able to sell, teach others how to sell, organize and manage territories. Applicants must be located in any of the following territories: Los Angeles, San Francisco, Seattle, Portland; and Kansas City, Missouri. Salary, expenses, and bonus. Full particulars regarding experiences and references must be given in first letter. Strictly confidential. Write to M. W. KNIGHT, c/o PEERLESS OF AMERICA, INC., 515 W. 35th St., Chicago, Ill.

POSITIONS WANTED

YOUNG MAN 26 years old. Several years' experience in refrigeration installation engineering and service maintenance. Knows latest controls, automatic heating stokers and oil burners. Graduate of Utilities Engineering Institute of Refrigeration of Chicago. Desires connections with manufacturer or dealer in refrigeration sales engineering, installation, or service. Box 910, Air Conditioning and Refrigeration News.

REFRIGERATION SERVICE ENGINEER. Several years' experience with all models Kelvinator, also 10 other makes, domestic, commercial, and air-conditioning. Can figure cooling and heating loads. Wide experience with automatic heating. Honest, dependable, ambitious, no boozer. Have tools and car. Will go anywhere. Located now in middle west. Box 911, Air Conditioning and Refrigeration News.

EQUIPMENT FOR SALE

USED NATIONAL REGISTER Company coin meters as used for meter refrigeration selling. In perfect condition—$2.50 each. 1—3 tap Temprite Cooler $65.00. 1—2 tap Temprite Cooler $50.00 for sulphur dioxide. RADIO CENTRE, 160 Orange St., New Haven, Connecticut.

EXPORTERS, Case and Service men—Frigidaire and Kelvinator compressor units ⅓ H.P. to 1½ H.P. air or water cooled thoroughly overhauled or not as you wish. Guaranteed against moisture. Have large assortment used fittings and 2-tray evaporators also panel valves. KENMORE ENGINEERING CO., INC., 82 Brookline Ave., Boston, Mass.

AIR COOLED condensers 9"x10½" double row. New $1.19. Three blade fan pulleys 7⅛", 2½" A groove, ½" bore $0.39. 8"x3" oval end receivers with valve, mounting bolt in bottom, inlet ftg. in top $1.19. Without valve $0.79. Tag controls, old style, but new, less plates $1.95 each. Penn type L, low side controls, specify settings desired, $3.25 each. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

DETROIT Thermostatic Expansion Valves. Several hundred purchased from a large manufacturer. New, in original cartons. Type 673 $4.95. Type 674 $4.75. Exchange price: type 673 $3.95, type 674 $3.75. Specify refrigerant, tube length and inlet and outlet connections desired. Right reserved to limit quantity and subject to stock on hand. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

REPAIR SERVICE

MAJESTIC AND GRIGSBY-GRUNOW refrigerator and radio parts service. We have purchased all of the original Grigsby-Grunow Majestic refrigerator and radio parts service. We are the only original, the only genuine, the only direct factory parts and service anywhere in the world. Beware of inferior replacements and parts. Everything we sell is factory guaranteed. Send for prices and dealerships. G & G GENUINE MAJESTIC REFRIGERATOR & RADIO PARTS SERVICE, 5801 W. Dickens Ave., Chicago.

EXPANSION VALVES, rebuilt or exchanged: Detroit, Fedders, American Injector, automatic $1.75; thermostatic $3.25. Mayson automatic $1.00. Household cold controls rebuilt or exchanged (modern types only) $2.25. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago, Ill.

MAJESTIC and General Electric units, rebuilt or exchanged. Any model Majestic $18.50. G.E. household models $25.00. Standard Majestic pumps, rebuilt or exchanged $4.95. Prices f.o.b. our factory with a six month guarantee. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

MAJESTIC — GENERAL ELECTRIC — SERVEL hermetic units repaired and exchanged. Majestic—$20.50—General Electric—$25.00—Servel—$18.50 F.O.B. our factory. One year unconditional guarantee. Every unit undergoes complete tests for temperature, cycling, wattage consumption and quietness on genuine test equipment. See our advertisement this issue under "Buyer's Guide". REFRIGERATION MAINTENANCE CORP., 365 E. Illinois St., Chicago, Ill.

GENERAL ELECTRIC and Majestic hermetically sealed units repaired and exchanged. Guaranteed work. Wholesale only. Give model when writing. All prices quoted f.o.b. Chicago. AMERICAN REFRIGERATING ENGINEERS, INC., 2257 Silverton Drive, Chicago, Illinois.

CONTROLS REPAIRED for the refrigeration and air-conditioning trade. Any make, almost any type. Every control individually calibrated. Steam traps, packless valve glands, and regulators repaired. If it contains a bellows, Halectric can repair it. Service prompt, prices right, guarantee reliable. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

SCHOOLS

ATTENTION, SERVICE MEN! Write for particulars concerning our extension course designed especially to give you a thorough knowledge of the technical part of refrigeration and air conditioning. For men with no refrigeration experience, we recommend our resident course. DETROIT SCHOOL OF REFRIGERATION AND AIR CONDITIONING, 4125 Grand River Ave., Detroit, Mich.

39,931 Ice Refrigerators Sold in California in 1936

LOS ANGELES—California ice industry salesmen sold 39,931 ice refrigerators in the state in 1936, according to D. H. Fry, secretary of the Southern California-Arizona Association of Ice Industries.

Sales of household mechanical refrigerators in the state during the year totaled 153,608 units, according to reports of the Refrigeration Division of National Electrical Manufacturers Association.

INFORMATION FOR SERVICE MEN

Common Characteristics of Carrene & Isobutane Refrigerants

Editor's Note: The following information, covering the characteristics of the refrigerants commonly known as "Isobutane" and Carrene," is part of the additional text for the new edition of the MASTER HOUSEHOLD REFRIGERATION SERVICE MANUAL by K. M. Newcum which will be published as Volume 6 of the Refrigeration Library in April.

The information is being published in REFRIGERATION NEWS for the benefit of subscribers who already own a copy of the MASTER HOUSEHOLD REFRIGERATION SERVICE MANUAL (Vol. 3), and also because we have received a number of requests from subscribers for basic data on these refrigerants.

46C. Carrene

Carrene is pleasant smelling and its chemical formula is CH_2Cl_2.

Its specific gravity as a liquid at 60° F. is 1.33. The specific heat of the liquid is .34. It is a stable refrigerant and it's critical temperature is 421° F.

Carrene is non-inflammable to the extent that it may be used to extinguish flames in about the same manner as carbon tetrachloride. It is non-corrosive and does not react chemically with water.

Chief difference between Carrene and the other more common refrigerants is its boiling point and operating pressures.

Temperature ° F.	Pressure Gauge Readings	Latent Heat
–10	27.08 inch vacuum	165.16
– 5	27.81 " "	164.21
0	27.48 " "	163.16
5	27.11 " "	162.1
10	26.69 " "	161.00
15	26.19 " "	159.9
20	25.60 " "	158.8
25	24.98 " "	157.75
30	24.27 " "	156.69
35	23.48 " "	155.59
40	22.63 " "	154.39
45	21.72 " "	153.25
50	20.67 " "	152.04
55	19.49 " "	150.89
60	18.19 " "	149.71
65	16.72 " "	148.47
70	15.09 " "	147.20
75	13.43 " "	146.10
80	11.54 " "	144.82
85	9.44 " "	143.54
90	7.44 " "	142.26
95	5.02 " "	140.97
100	2.40 " "	139.65
105	.19 lbs. gauge	138.30
110	1.62 " "	136.98
115	3.12 " "	135.53
120	4.75 " "	134.20
125	6.56 " "	132.80

Note in the pressure-temperature table that with temperatures below 105° F. at atmospheric pressure Carrene remains a liquid. Thus it can be poured from one container to another like water at any temperature below 105°.

Due to this high boiling point, a system using Carrene operates in a vacuum on both the low and high sides if the condenser temperature is below 100°.

It is not uncommon in a cool room to see a Carrene system operating with 10 inches of vacuum on the high side.

Following the pressure-temperature chart for Carrene, it will be found that to produce a refrigerant temperature of around 10° in the evaporator, the low side will be operating at around 27 inches of vacuum.

The question might arise as to what causes the refrigerant to circulate if there is no gauge pressure on the high side, but it must be understood that it is the difference between the two pressures (absolute) or vacuums as they are more commonly called, that causes circulation—the same as with any refrigerant.

Carrene is used as a refrigerant for household purposes exclusively by Grunow and is obtainable only through an authorized Grunow dealer or distributor.

46B. Isobutane

Isobutane has a sweetish odor similar to methyl chloride. It was used several years by Copeland in their household electric refrigerators under the trade name of "Freezol." Ilg Ventilating Co. also used Isobutane as a refrigerant in domestic refrigerators manufactured by them chiefly for Graybar.

Isobutane is considered harmless to any form of life. It has no corrosive effect on the common materials used in refrigeration systems, even in the presence of small amounts of water.

The condensing pressure of Isobutane is very near, possibly a little below, that of SO_2. Its boiling point is 10° F. at atmospheric pressure. This, too, is close to SO_2.

Isobutane is a stable gas and does not break down at normal pressures encountered in a refrigeration system.

The critical temperature of Isobutane is 272.7° F. and the critical pressure is 537.1 pounds gauge pressure.

Isobutane, like methyl chloride, mixes with the lubricating oil to a certain extent, but with the proper oil the lubricating effect is not damaged.

Isobutane is inflammable and will burn when mixed with air. Care should be exercised when working around Isobutane to prevent large quantities of the gas from escaping where a spark or open flame might be present.

Voss Circular Describes Compressor Valves

NEW YORK CITY—J. H. H. Voss, Inc., manufacturer of valves for ammonia, air, and gas compressors, has issued a circular describing its line of equipment, and showing photographs of exhibits which it conducted at several expositions last fall and winter. Instances of several specific installations of the equipment are detailed in a letter accompanying the circular.

Fairbanks-Morse Bulletin Describes Motor Line

CHICAGO—A new bulletin has been issued by Fairbanks, Morse & Co. describing its line of polyphase wound-rotor or slip-ring, ball-bearing, induction motors. The motors are designed for use where the relatively high starting current of squirrel-cage motors would be objectionable, or where the size of motor required is relatively large, with respect to power supply.

Rountree-Jones Appointed Norge Dealership

RICHMOND, Va. — Rountree-Jones Furniture Co., Inc., has been appointed a Norge dealer here.

147 Dayton Rubber Employes Attend 10-Year Club Banquet

DAYTON—First banquet meeting of Dayton Rubber Mfg. Co.'s Ten-Year Club was held March 12 in the Egyptian Room of the Dayton Biltmore hotel. Attending were 147 of the company's employes oldest in point of service. Ten years employment with the company is prerequisite to membership.

Climax of the meeting was the presentation of service emblems—gold pins bearing the company emblem and the number of years the individual has been with the company—to all veteran employes. Four 25-year members received diamond service emblems.

Factory Superintendent H. S. Mooradin, himself a 25-year man, was master of ceremonies. Addresses were made by A. L. Freedlander, president; C. E. Hooven, vice president; W. G. Pickrel, member of the board of directors, and Dusty Miller, humorist.

Hall & McCoy Manage New Chester Dealership

CHESTER, S. C.—Chester Radio & Electric Co. has opened here under the management of James Hunter Hall and Daniel T. McCoy, Jr., as a dealer in radios and electric appliances.

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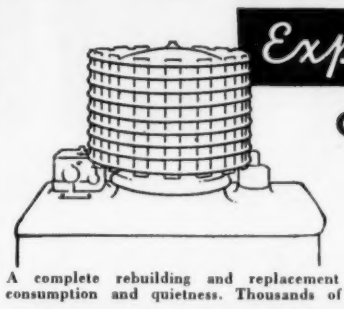

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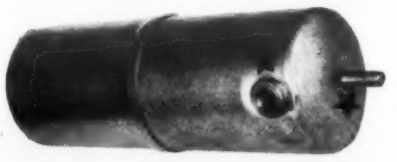

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